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ADMINISTRATION OF THE TORONTO DEPARTMENT OF PUBLIC HEALTH

By TORONTO BUREAU OF MUNICIPAL RESEARCH

Horace L. Brittain, Director

III

(Continued from last issue)

DEPARTMENTAL DIAGNOSTICIAN.

WHAT HE DOES.

THE Diagnostician is called upon to diagnose doubtful cases of contagious diseases for the Division of Communicable Diseases and Quarantine, and occasionally for physicians in private practice.

From 9 to 10 each morning he vaccinates, free, all applying or sent for vaccination.

He examines applicants for positions in the Fire Department and on the Civic Car Lines. He is also called upon to examine civic employees who are off duty on account of illness, and occasionally examines for the Juvenile Court and the Children's Aid Society. Occasionally, at the request of the Police Department, the diagnostician visits prisoners in cells.

OFFICE ACCOMMODATION.

The diagnostician is the only member of the division. He makes monthly and yearly reports to the Medical Officer of Health. No time sheets are kept as a basis for functional cost accounting by the accounting division. The cost of the various functions should be known, particularly the cost of work done for other

departments. Records of calls made and examinations of firemen are kept by the division.

CO-OPERATION.

The health nurses regularly report to the diagnostician cases which they think the doctor should see. Co-operation between the diagnostician and the Division of Communicable Diseases and Quarantine is very close. The head of the latter division reports all suspicious cases to the diagnostician, who reports back.

The diagnostician also diagnoses cases at the request of citizens and private practitioners, especially in "charity cases."

NEEDS OF THE DIVISION.

The division occupies about 25 square feet of floor space in a passage-way, from the rest of which it is screened off by a movable screen. There is practically no natural lighting. What there is comes from a very small window at the head of a stairway and by diffusion from the room occupied by the statistician. Notwithstanding this, until recently the eyes of applicants for civic employment were tested here. Recently they have been tested in a stock room which receives natural light only indirectly and which is

not long enough to permit of proper tests being made. Effective work under these conditions is impossible. A properly lighted room of sufficient dimensions is needed forthwith.

The facilities for vaccination are not much better. Privacy is not obtainable. The work is done in semi-darkness. The quarters are crowded and it is difficult to keep them clean. One wall is occupied by books and magazines, the other by a case for simple medical supplies. A small, sanitary and well-equipped surgery is urgently needed.

sion could be charged with doing the medical work of all city departments, including the police.

Failing the close organization of a Medical Division the location of the heads of these divisions in the same office would facilitate co-operation.

DIVISION OF COMMUNICABLE DISEASES AND QUARANTINE.

WHAT IT IS.

The Division of Communicable Diseases and Quarantine is the agency of the De-



OFFICE OF DIAGNOSTICIAN

GENERAL RECOMMENDATION.

If the work of the Diagnostician, the Child Hygiene Division and the Inspector of Baby Homes could be combined into a strong medical division, with an experienced medical man at the head directly responsible to the Medical Officer of Health, the question of increased co-operation would be completely solved, and, with sufficient assistance, the new divi-

partment of Public Health, which is primarily responsible for all practical measures taken by the department to prevent the spread of contagious diseases.

WHAT IT DOES.

The division quarantines all cases of contagious diseases. When a physician reports a case, an inspector visits the house concerned and reports on conditions of isolation, etc., and placards the

house, where this is called for by the regulations. If the patient is taken to the hospital, the house is immediately disinfected. In other cases, disinfection occurs at the end of the quarantine period.

ORGANIZATION.

In addition to the chief of the division, the employees include ten inspectors and three disinfectors. All assignments are given by the head of the division. These are recorded daily in a book kept for the purpose. A slight change in the daily reports would enable them to be used as time sheets, which could be made the basis of functional cost accounting by the accounting division.

Monthly and yearly reports are made to the Medical Officer of Health.

The following diseases are reportable:

Diphtheria.
Scarlet Fever.
Measles.
Whooping Cough.
Chicken-pox.
Mumps.
Erysipelas.
Infantile Paralysis.
Typhoid Fever.
Tuberculosis.
Smallpox.

The following diseases are placarded:

Diphtheria.
Scarlet Fever.
Measles.
Cerebro Spinal Meningitis.

The efficiency of the division depends largely on the promptness of reports made by attending physicians. As a general thing physicians do report cases within the 12-hour limit. In 28 years only two physicians have been prosecuted for failure to report.

In cases where there is no physician in attendance, neighbors or clergymen often report directly to the department. In such cases the diagnostician always visits and reports upon the case.

Complete quarantine is established for diphtheria, scarlet fever and measles, and partial quarantine for chicken-pox, mumps, whooping-cough and erysipelas. In the latter group, children are not allowed to go to school or to mix with adults or other children. Adult mem-

bers of the family are allowed to go to work if they are well isolated.

The Board of Education and the Hospital for Sick Children are notified daily of all cases of communicable diseases.

Quarantined cases are, as a practice, visited daily, especially in serious cases and where home conditions are not satisfactory.

In a case of smallpox the whole family is quarantined and the patient sent to the Isolation Hospital. For other diseases, where the patient is isolated with an attendant, the family is not confined to the house. Where isolation within the home is not possible, the division invariably advises the removal of the patient to the Isolation Hospital.

Mumps and whooping cough have to be treated at home, as these diseases are not received by any existing hospital.

Families living in apartments adjacent to cases of infection are placed under observation where there has been communication, especially between children.

Fumigation is resorted to in smallpox, scarlet fever, diphtheria, measles and tuberculosis.

In cases of necessity coal and rough groceries are supplied. Where delicacies are necessary, the Health Department orders and pays for them. At present, however, as a result of the consistent policy of the department, the patient is sent to the hospital. This enables the wage earner to keep at work, while safeguarding the interests of the patient.

Every case presenting unusual features is reported at once to the epidemiologist attached to the Division of Laboratories. He studies such cases carefully and recommends such action, in addition to the usual routine, as is best calculated to prevent the spread of contagion. Through co-operation with the Division of Laboratories also all efforts are made to trace sources of infection. In a book register of contagious diseases, the various milkmen are "charged" with cases occurring on their routes. An increase in the normal percentage of "charges" leads to action and follow-up work by the Division of Laboratories.

School classes are also watched for the spread of contagious diseases. Public

School, Public Library and Sunday School Library books are invariably destroyed. There is no reimbursement for books destroyed. Notice is simply sent to the institutions owning the books.

Contagious diseases are not recorded by wards. All cases are entered in a book, under date of reporting. There is also a register which shows the cases arranged according to inspection district.

Cases are not arranged or indexed ac-

eases and Quarantine against the occurrence and spread of infection.

OFFICE ACCOMMODATION.

The description of conditions in the Division of Sanitation applies to the Division of Communicable Diseases and Quarantine with equal force. The division occupies one desk.

NEEDS OF THE DIVISION.

All the division needs is more space in a well lighted and ventilated office.



Joint office of the three divisions of Sanitation; Communicable Diseases and Quarantine, and Housing and Industrial Hygiene.

cording to street and number. It is, therefore, difficult to get the facts with regard to any particular locality, dwelling or lodging-house.*

CO-OPERATION.

The description of the divisional organization renders unnecessary any discussion of this topic. The health nurses, the diagnostician, the Laboratories Division, general practitioners, the school authorities, combine in a general conspiracy with the Division of Communicable Dis-

GENERAL RECOMMENDATIONS.

While the information supplied by the records is very full, it is probable that a committee made up of the head of the division and the chief statistician could work out improvements in the technique which would shorten labor and render essential facts more readily available for administrative purposes.

The Division of Communicable Diseases and Quarantine might well form a Bureau of a Medical Division, such as is

*Since writing the above an excellent system of indexing by street and number has been introduced, so that any street number can be found almost instantaneously. A new system of filing Inspectors' reports has also been introduced. A pin-map shows all cases of diphtheria, scarlet fever and typhoid. The aim is to keep this continuously up to date.

suggested in the report on the diagnostician. The organization could remain intact, but by tying up the division with a Medical Division, expert medical direction and advice would be always and readily available. Such an arrangement would cut down the number of divisional heads directly responsible to the Medical Officer of Health. It would simplify administration still further perfect co-operation and give expert medical direction to a division whose work most needs it.

In case it is not, at present, advisable to organize a regular Medical Division, it would be well to consider the advantage of placing the diagnostician, the director of child hygiene, the inspector of baby homes and the chief of the Division of Communicable Diseases and Quarantine, in the same office, so that discussion of related problems and co-operation would be rendered easy. Frequent conferences between the division heads would serve somewhat the same purpose as close divisional organization.

DIVISION OF MORGUE AND AMBULANCES.

WHAT IT IS AND DOES.

This division takes charge of all bodies brought in by the police, pending identification or coroner's trial. No body can be taken from the Morgue until the coroner's order is received.

It also transfers from their homes or from the various hospitals all persons with contagious diseases who are to be admitted to the City Isolation Hospital, on order from the Division of Communicable Diseases and Quarantine; and also transfers to all other hospitals in the city cases of typhoid, gangrene, erysipelas, meningitis, etc.

ORGANIZATION.

There are at present, in addition to the chief of the division, six employes. There are two day and one night ambulance man, a caretaker of the building who assists at post mortems, a night man at the Morgue and a relief man.

Daily reports are made of transfers to the City Isolation Hospital.

Monthly and annual reports are made to the Medical Officer of Health.

ACCOMMODATION AND NEEDS.

The Division of Morgue and Ambulances, from the standpoint of light, ventilation and space, seems to be the best housed of all the divisions of the department.

Excluding the court rooms, the cubic feet of air space per employe is about 4,000. The court and rooms connected with the court are spacious. The ratio of lighting to floor space in the chief's office is 1 to 3½.

At present the division has one motor and three single horse ambulances. The replacement of two of the latter by a motor ambulance is being considered.

An electric saw for dissection work would facilitate autopsies.

DIVISION OF HOSPITALS.

WHAT IT IS AND DOES.

The Division of Hospitals receives and cares for cases of diphtheria, scarlet fever, smallpox and mixed infections. There are separate buildings for scarlet fever and diphtheria. Mixed cases of infection are housed in the main portion of the building, which serves as office and nurses' home. There is no provision for taking care of chicken-pox, measles and whooping cough. Smallpox is sent to the of the cases of measles which occur in Swiss Cottage Hospital, which is half a mile up the Don.

The city has an arrangement with a private measles hospital at Selby Place. The proprietress receives \$100 monthly as a retaining fee. This covers the admission of three city patients per month. For patients sent beyond this number the city pays \$7.00 per week. This hospital, of course, can handle but a small percentage the city in any one year. The diagnostician supervises the work of this measles hospital.

The buildings of the Isolation Hospital are clean and sanitary in every respect and reflect credit on the Superintendent of the Hospital and the Superintendent of Nurses.

CO-OPERATION WITH OTHER DIVISIONS.

Lists of discharged cases are furnished to the public health nurses wherever follow-up work is desirable. Death rate fig-

ures are turned over to the Vital Statistics Division each month. Swabs are taken at the hospital twice a week as a matter of routine and are sent to the Laboratory, where they are examined and reported upon.

The Isolation Hospital receives its Laboratory supplies through the City Hall Laboratory.

DIVISIONAL ORGANIZATION.

There are 72 employees, made up as follows: a medical superintendent, assistant medical superintendent, two house surgeons, superintendent of nurses, dietitian, two bookkeepers and telephone operators, chief engineer, two assistant engineers, five orderlies, kitchen porter, two cooks, assistant cook, maid in charge, 12 maids, two head nurses, a night supervisor, 12 nurses, 15 junior nurses, nurse (Swiss Cottage), laundry manager, four laundry assistants. In addition, an engineer and an orderly are with the First Canadian Contingent.

The superintendent of the hospital makes assignments to the house surgeons; the superintendent of nurses makes assignments to the nurses. All assignments are oral. Nurses serve for two and a half years and house surgeons for six months.

The routine of each patient from admission to final discharge is of such a nature as to decrease to a minimum the danger of infection.

RECORDS AND REPORTS.

The superintendent of nurses, in addition to her duty of training the nurses, has charge of the ordering of all provisions and of the bookkeeping. Two books of memorandum are kept, one showing provisions ordered, quantity, amount to be paid, and from whom ordered; the other showing staples and equipment ordered, with details as above. These books cannot be used to check invoices, as the return of goods is not recorded. Invoices accompany all orders filled by each dealer. Monthly statements are checked up with these invoices and if correct are certified to by the superintendent of nurses and sent to the accounting division of the department for payment, the invoices being kept on file at the hospital. Requisitions of orders

given for all supplies except provisions, which are furnished on contract, are made out in duplicate after goods and invoices have been received. The original is sent to the accounting division and the duplicate is filed in the hospital. This memo is nothing more than a duplicate of the invoice, and the same result would be attained if the dealers were obliged to submit their invoices in duplicate, one to be kept at the hospital and the other to be sent to the accounting division of the Department of Public Health.*

Supplies are issued to nurses on requisitions showing provisions, etc., required. Any additional supplies required after this requisition is presented have to be passed by the superintendent of nurses, who issues a supplementary slip for the same. The original requisitions and the slips are entered in a supply book which, on account of its unwieldiness, is commonly known as the "judgment book." This book at the present time is kept only for the purpose of protecting the superintendent of nurses in case questions should arise as to the disposal of the supplies. It also, in a general way, supplies some sort of check on the carelessness, or otherwise, of the nurses requisitioning. With the revision of the requisition slips it would be possible to make this book the basis for figuring out costs of supplies according to function.

In another book is kept a record of all anti-toxin received and amounts handed out by the superintendent of nurses. Nurses are required to keep memoranda of all anti-toxin administered to patients and a record is kept at the desk of all anti-toxins given out to citizens on doctors' orders.

An attempt is made to balance these records yearly, and it is said that the items representing income and outgo tally fairly well. It is taken for granted that any slight discrepancy would be accounted for by broken vials, etc.

It would seem that a great deal of the time of the superintendent of nurses is taken up with her bookkeeping duties.

The cost and maintenance of Isolation and Smallpox hospitals per capita was, in 1912—\$1.24, and in 1913—\$1.60. During 1913 the per capita cost at the Isolation Hospital proper was \$1.53, and

*Since writing above a complete system of duplicate requisition slips, in two colors, has been installed. These are in use in all divisions of the department. Originals are filed in the Secretary's office and serve on the order book which is to be used as a basis for functional costs.

the cost at the Swiss Cottage Hospital \$3.36. The large per capita costs per day at the Swiss Cottage Hospital are of course due to the small number of patients. The increase in per capita cost is probably due to increase in food prices and increase in staff. The costs do not include debt charges.

The Director of Hospitals states that these estimates of per capita costs are based on figures supplied by the Accounting Division, as the hospital records do not always tally with the departmental accounts.

The per capita costs of the Isolation Hospital are not, in the circumstances, excessive.

No service records are kept for surgeons, but rather elaborate records are kept for nurses. Three separate cards are kept, as follows:

Record of student's work.

Student's History Card.

Summary Card.

Details from the summary card are posted to a large and unwieldy book, which is, in effect, a time book, and is known as the "Day Book." This book might be made the basis for computing functional costs. When time sheets are adopted the book in its present form will be unnecessary.*

ACCOMMODATION.

The office of the superintendent of the hospital and the superintendent of nurses, the outer office and the inner office are fairly commodious. They are extremely well lighted and have an entirely sufficient amount of air space.

RECOMMENDATIONS.

As the superintendent of nurses takes charge of all accounts and certifies accounts for payment, does the buying of provisions and supplies, in conjunction with the dietitian, she is not able to give as much of her time to the teaching and supervision of nurses as she otherwise might. This would seem to be her most important work.

Except that the superintendent of the hospital O.K.'s orders for new equipment and staples, he has very little to do with the control of the hospitals outside of the

purely medical work and the supervision of the internes.

The results of the division of authority are fairly evident. One person should be made directly responsible to the Medical Officer of Health for the management of the institution. The girls at the switchboard at the present time occupy what leisure they have in recording admissions and discharges, filing the histories of cases, etc. It is recommended that clearly defined nursing, housekeeping and reporting and accounting sections be established, each with a head responsible to the chief of the hospital. If necessary the housekeeping bureau might be made directly responsible to the superintendent of nurses.

The whole system of records should be overhauled, with the co-operation of the Statistical Division. The same should be done with the accounting under the direction of the Accounting Division and with the active co-operation of the office of the City Auditor.

There may have been at one time a sufficient reason for establishing the Swiss Cottage Hospital at some distance from the other hospital buildings of the division. At present the operation of a smallpox hospital as a unit of Isolation Hospital work is recognized as being entirely feasible. It might be worth while to consider the advisability of centralizing the work of the Isolation Hospitals with a view to cutting down the expenses and increasing the efficiency of the administration.

The layout of the wards is to much greater advantage in some cases than others. It is recommended that when additions are necessary economy of space be fully considered.

DIVISION OF DENTAL CLINICS.

WHAT IT IS AND DOES.

The division does dental work for children all over the city where free work is necessary. These children come from public schools, separate schools and charitable institutions, such as the Boys' Home, Girls' Home, Orphanages, etc.

At its inception Sir Edmund Osler contributed \$500 and the dentists of the city \$700, which sums covered the cost of the original equipment.

*Since writing the above the use of time sheets has been decided upon. Monthly and yearly reports are sent to the Medical Officer of Health.

CO-OPERATION WITH OTHER DIVISIONS AND DEPARTMENTS.

The dental clinics co-operate with those maintained by the Board of Education and do work not done by them. For example, the Board of Education clinics do no extracting and do not administer anaesthetics. Where these are necessary the Department of Public Health does the work. Again, schools not served by school clinics, such as the Elizabeth St. School, send their children to the city clinic.

In the course of their visiting the health nurses frequently discover children needing dental attention. After these are passed upon by the Public Service Division, they are (if necessary) referred by card either to the City or Board of Education clinics.

The head of the division is now engaged in establishing dental clinics for needy adults in connection with the out-patient departments of the General and Western Hospitals. At the General Hospital all cases will be investigated by its Social Service Department. At the Western Hospital investigations will be made by the Public Service Division of the Department of Public Health.

ORGANIZATION.

The division at present employs six operators, on half time—three in the morning and three in the afternoon. A nurse and janitor are also employed.

The operations performed each day are entered up and credited to each operator.

An individual record card is kept of each patient, which is kept up to date as long as he maintains relations with the division.

ACCOMMODATION.

The clinic has two operating rooms and a reception room. These are light and airy. One extra room is needed, as one operating room now contains two chairs. If another operator were employed two additional rooms would be necessary. An extra nurse is needed on Fridays, and if a chair is added an extra nurse will be needed on full time. A rest room also should be provided.

GENERAL RECOMMENDATIONS.

It is recommended that an effort be made to centralize all dental work for which the city pays. A conference of all authorities concerned could surely work out a plan of effective co-operation which would make any duplication impossible and would decrease the city's rent bill and overhead charges considerably.

The head of the division should be placed on full time as soon as possible.

DIVISION OF FOOD INSPECTION.

WHAT IT IS AND DOES.

The chief function of the division is to inspect food in the markets and in the shops. Meat and fish inspection consume most of the inspectors' time. Bread, butter, fruit and vegetables receive considerable attention.

The division also investigates and deals with the complaints of citizens re bad meat or fish, canned goods, etc.

In 1914 as a result of 33,324 inspections made in shops and markets, the following condemnations were made:

Fish—

Loose, lbs.	88,549
In boxes and baskets	588
In tins	1,325
Fruit in baskets and other vessels	721
Potatoes, bags	1,260
Vegetables, such as carrots, in bags, hampers and boxes	1,001
Carcasses of calves, sheep and lambs.	23
Quarters of veal, beef and mutton	37
Pieces of meat, lbs.	1,348
Smoked meats, bacon, hams and bologna, lbs.	1,270
Butter, lbs.	3,030
Bread, loaves	4,700
Pickles, gallons	10
Pickles, bottles	54
Figs, lbs.	215
Maple syrup, tins	24
Fruit, tins	17
Honey, lbs.	14
Tomatoes, baskets	574
Shelled peanuts, bags	49
And odd quantities of fruit, etc.	

CO-OPERATION WITH OTHER DIVISIONS.

The inspectors of live meat, in the Meat Inspection Division, being veterin-

ary surgeons, are called upon frequently to make scientific examinations of condemned food as a basis for departmental action.

The division co-operates with the bakery inspectors of the Division of Sanitation. Midnight raids are occasionally made for short weight bread. When ten short-weight loaves are seized, the head of the Division of Sanitation prosecutes.

There is apparently no co-operation with the Division of Health Nurses nor other divisions of the department.

OFFICE ORGANIZATION.

There are at present only two employees—the chief and one assistant. Even with three inspectors, at the present rate of inspection, over 11,000 inspections would be made per year by each inspector. This would mean about 40 inspections per day. It is evident that the present force is inadequate for the inspection of the food of a city of 100,000 homes. It should be borne in mind, however, that in the congested down-town section inspection is comparatively effective, as the stores and markets are close together and sell a large proportion of the total food supply of the city.

Inspections are reported daily, and in addition to special reports, monthly and annual reports are made to the Medical Officer of Health.

Inspections are made of butcher shops, fish shops, grocery shops, fruit stores, pickle factories and sausage factories.

Score cards are not used by the division. The possible advantage of the use of score cards for some kinds of establishments selling or producing provisions might be considered.

The destruction of condemned food is rather a serious problem, as the city owns no incinerator. Sometimes it is necessary to send loads of condemned fish to the Cherry Street dump, where it may get into the water. As the head of the division expressed it, "this is no proper destruction of a dangerous thing." Occasionally confiscated foods are burned at the St. Lawrence Market or the City Hall if the furnaces are going.

Inspectors personally look after the destruction of condemned foods, although

in some cases it is necessary to send an expressman for the goods unaccompanied.

Stores in St. John's Ward are inspected on the average once per week, stores in the outskirts not oftener than twice per month.

If stores are found in bad condition, the proprietors are ordered to clean up. If after re-visiting, the improvement ordered has not been made, the proprietors are prosecuted for maintaining a public nuisance.

There is no medical inspection of employees in establishments selling food to the public. While this is not found elsewhere, the worth-while-ness of such inspection should be considered. If found desirable the necessary funds should be provided.

Short-weight bread and butter seized by the division are divided between various charities of the city. The reason some of the institutions receive more than others is the fact that raids on bakeries are made at night, and it is necessary to take the confiscated goods direct to some institution which will be open to receive it—the House of Providence is always open and it is therefore a simple matter to take the bread to them. Distribution last year was as follows:

House of Industry—	
Loaves bread	412
Rolls butter	128
House of Providence—	
Loaves bread	1,635
Rolls butter	710
Boys' Home—	
Loaves bread	619
Rolls butter	472
Girls' Home—	
Loaves bread	259
Rolls butter	297
Sick Children's Hospital—	
Loaves bread	27
Rolls butter	271
House for Incurable Children—	
Loaves bread	12
Rolls butter	123
"The Haven," Sackville Street—	
Loaves bread	29
Rolls butter	220

Protestant Orphans' Home—	
Loaves bread	55
Rolls butter	232
Sacred Heart—	
Loaves bread	36
Rolls butter	210
Children's Aid Society—	
Loaves bread	1,581
Rolls butter	500
St. Vincents' Orphans Home—	
Loaves bread	47

An effort should be made to systematize more thoroughly the distribution.

In St. John's Ward stores, such as those selling fish, are frequently located in the front rooms of dwellings, often with no effective isolation from the rest of the house. The adjoining room may be a bedroom. In fact, it is difficult to secure the proper sanitary conditions. If St. Patrick's Market could be extended to contain a Hebrew market, fish merchants and others might, without injustice, be compelled to take space in the place provided by the public.

OFFICE ACCOMMODATION.

The division has no office space or desk room of its own. It borrows desk room from the Plumbing Division, itself seriously overcrowded. As a result, it cannot be expected that the record of the division can be adequate.

NEEDS OF THE DIVISION.

The division needs desk space, an extra horse and buggy (it now has one rig), and a pocket instrument for testing eggs.

GENERAL RECOMMENDATIONS.

To overcome the difficulty at present experienced with short-weight butter, steps should be instituted to secure an arrangement by which all butter exposed for sale should show on the wrapper the quality of the butter and the name of address of the maker.

Provincial legislation is needed to make illegal the slaughtering of animals without inspection, or in the case of small butchers or farmers, compelling them to ship the carcasses with heads, lungs and entrails attached. Municipalities should have the power to reject dead meat which is neither slaughtered under inspection nor inspected after slaughter under the

conditions above noted. Under other conditions inspection of dressed meat is largely futile.

The Divisions of Food Inspection and Meat Inspection should be merged under the headship of a competent veterinary surgeon. This would simplify administration, save considerable time in transportation and give the inspection a more expert character.

DIVISION OF MEAT INSPECTION.

WHAT IT IS AND DOES.

The Division of Meat Inspection is responsible for the task of preventing diseased meat being offered for sale in Toronto. It performs ante-mortem inspections, post-mortem inspections, inspections of dressed meat coming into the city and inspection of meat-curing with reference to the use of preservatives.

The division also investigates citizens' complaints re meat and poultry and does the veterinary work for the Street Cleaning Department.

The six abattoirs in the city are under Dominion inspection. The 17 slaughter houses are inspected by the civic authorities.

The number of slaughter houses makes it impossible to inspect all animals slaughtered. Not more than 50 per cent. of the animals are killed under the inspection of the division, but no carcass is stamped unless an employe of the division has seen the animal killed, and post-mortems it.

In 1913, the total slaughter in Toronto was 124,996 animals. The total number of animals inspected was 35,361—28.2 per cent. of the total slaughter. In 1914 the percentage inspected was 24.8 per cent. The decrease is due to the reduction of the inspection force by 50 per cent. owing to enlistments for the war.

There is no regular routine inspection. The division is compelled to "cut its goods according to its cloth." Careful watch is kept on slaughter houses as to the quality of animals they are handling and inspection is distributed accordingly. Some slaughter houses are visited almost daily.

Ante-mortem inspection of animals is made at the stock yards. Animals sus-

peeted of being diseased are sorted out and killed under the personal supervision of federal or local inspectors. Diseased animals are killed last. One civic inspector attends at the Union Stock Yards four half days per week—the regular market days. The Western Stock Yards are "sampled" at intervals only, as animals coming here are practically all killed in the civic abattoir, which is under federal inspection.

There is practically no danger of leakage of diseased carcasses from the six large abattoirs, as 100 per cent. of the animals are inspected and no carcasses are accepted from outside save those having the Federal Government stamp.

The chief possibility of leakage occurs where animals slaughtered outside are sent to slaughter houses where there is no federal inspection, or are sold in the markets. The civic inspectors cannot, of course, certify such carcasses as they were killed without civic inspection, and, in fact, often with no inspection. If it were required that all carcasses shipped into Toronto should have lungs, heart, liver, intestines and head attached by their natural attachments, it would be possible for the civic inspectors to attach their stamp. At present there is no effective control over importation of meat and meat food products into Toronto.

When infection is general carcasses infected with tuberculosis and actinomycosis are destroyed. In all other cases infected portions only are destroyed.

An explanation of the terms "localized" and "generalized" as understood from a meat inspection standpoint may help the reader.

- (a) "Localized"—confined to one or more parts, the organisms of the disease not having gained entrance to the blood-stream;
- (b) "Generalized"—the organisms present in the blood, hence carried to every part of the body.

The entire carcasses of animals effected with the following diseases are always condemned: Anthrax, blackleg, septicemia, sapremia, pyemia, vacceina, tetanus, rabies, Texas fever, parasitic ieterohematuria, pneumonia, pleuritis, pericarditis, peritonitis, meningitis, fever, ieterus, uremia, emaciation, toxemia, etc.

The entire carcass is condemned only when the following diseases are "generalized": Tuberculosis, actinomycosis, parasitic cysts, hog cholera, mange, nephritis, melanosis, sexual odor, caseous lymphadenitis, etc.

All the abattoirs have tanks for this purpose and condemned carcasses are disposed of in these at once. One of the slaughter houses also has a tank. In the case of carcasses condemned in other slaughter houses, the owners take the carcasses to the abattoirs, where they receive a certain amount for the hide and other by-products. The abattoir furnishes the Division of Meat Inspection with receipts for carcasses of all animals condemned. This provides an absolute check.

CO-OPERATION WITH OTHER DIVISIONS AND DEPARTMENTS.

The division acts in close co-operation with the Division of Food Inspection, which refers to it all cases requiring veterinarian training.

It does the veterinary work of the Street Cleaning Division. It co-operates with Federal inspection by avoiding all overlapping of functions.

When contagious diseases are discovered, the Federal authorities are notified as well as the Division of Communicable Diseases and Quarantine.

OFFICE ACCOMMODATION AND NEEDS OF THE DIVISION.

The office accommodation may almost be said to be non-existent. The division has joint use of a shelf with a superficial area of about seven square feet. This is in front of the only window of a room occupied by several divisions. Others making use of the shelf are the supervisor of Baby Homes, the four food inspectors, and occasionally plumbing inspectors. Beside the shelf there is a cabinet for records. It is to be doubted whether there is a more congested corner anywhere in the Empire.

Certainly one desk and room should be set apart for the division. A small dispensary might well be added.

If all slaughtering could be centralized in the five private abattoirs and the

municipal abattoir, the work of the division could be cut down to dimensions which could be adequately handled by the normal force of four men. The division could then confine its attention to municipal abattoir, the work of the division the inspection of incoming dressed meat and veterinary work for other city departments.

ments and that legislation be sought, if necessary, to make this possible.

3. That slaughter houses, wholesale butchers and all places where meat food products, such as sausages, meat pies, etc., are manufactured or exposed for sale, be licensed after the issuance of permits by the Medi-



"OFFICE" OF THE MEAT INSPECTION DIVISION

GENERAL RECOMMENDATIONS.

It is recommended:

1. That all slaughtering not now done in five private abattoirs be centralized in the civic abattoir.
2. That no dressed carcass be admitted to the city unless the head, heart, lungs and liver are attached to the carcass by natural attach-

cal Officer of Health. (At present the Medical Officer of Health has no power to close a slaughter house even if it is in a very unsanitary condition. The only recourse is prosecution and at most a fine.)

4. That employees of all establishments where meat is handled be subject to regular medical inspection by the Department of Public Health.

(To be continued.)

THE STANDARDIZED DEATH RATE OF BRITISH COLUMBIA

By Fleet Surgeon W. E. HOME, R. N.

We learned in July that the crude uncorrected death rate of the white population of British Columbia for 1911 was 9.34, but that that figure could not be directly compared with the death rates stated for other communities, since the death rates of communities vary with varying proportions of the sexes (men dying more numerously than women) and owing to the differing proportions at different ages among their populations. Thus a community, although it lives in a better climate and has its sanitary administration more wisely organized than another, will yet of the two have the higher death rate if it has many children under five and many persons over fifty, while the other community has few children and few old people, but includes an unusual number of persons in the middle period of life, when death rates are low. We must now examine how these crude death rates can be made comparable.

The death rate of any community is the figure obtained by dividing the total deaths of the year by the number of thousands in the population. It depends then on two independent variables, and in order that we may be able to compare these fractions as they are stated for different communities they must be reduced to a common denominator, as Dr. Cressy Wilbur, Chief Statistician for Vital Statistics of the United States Census Bureau, has felicitously put it. Obviously, if it can be managed, the thing to do is to express the deaths in terms of some standard population for then each death rate will represent but a single variable, the number of deaths. All death rates will then be comparable and we shall be able to make proper use of them to test the degree of success attained by the sanitary administrators of any district in their endeavors for the health of the people.

The correction is accomplished, as Dr.

Stevenson says in the English Registrar-General's Report for 1911, by a sort of handicapping. This community with few children must have a low crude death rate. It is therefore weighted so it can be compared with the other, with many children and old people, whose death rate is lowered. The standard population chosen, in terms of which to express these death rates is the large, well-registered, and hygienically well-protected, population of England and Wales in 1901—41 million souls. It is, as shown in the diagram, a very evenly constituted population, and has been adopted as the standard population not only within the British Empire but also in the United States.

The standard death rate chosen is the mean death rate of England and Wales for the last completed decade, at present 1901-1910; that, like the details of the standard population, is stated in the report of the Registrar-General for 1911.

We set about our standardization by arranging the population of British Columbia, by sexes, in each of the Registrar-General's twelve age groups, which we do by the methods explained in July and set out here in tables I., II., and III., which explain themselves to anyone accustomed to work with statistics.

Now we have obtained the number of males and females in each of the twelve age groups, we proceed (table IV.) to calculate for each group the deaths that would have occurred among them in a year at the standard death rate (England and Wales 1901-10), and so we find that among the 366,737 white people in British Columbia, who, in their own Province experienced 3,428 deaths, there would have occurred at the standard death rate 4,585 deaths,

4585

which corresponds to a death rate of $\frac{366,737}{4585}$

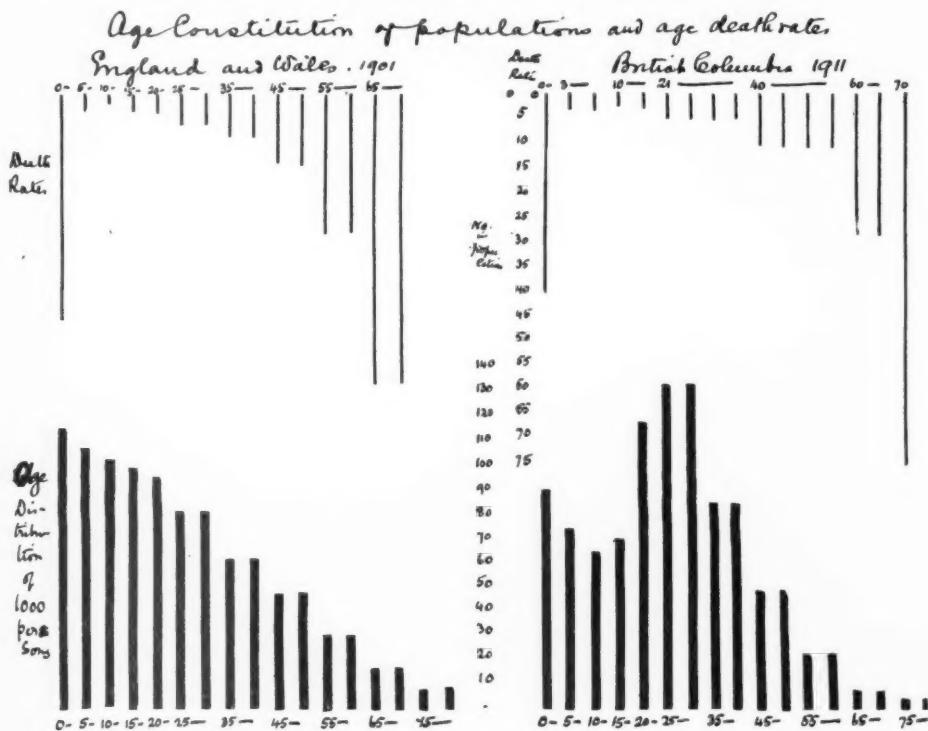
366.737

or 12.5, which we term the index death

rate for British Columbia. It is the rate at which we would have expected the people of the Province to have died had they been living distributed evenly about England and Wales instead of dwelling, as they were, in British Columbia. It is a function of the age and sex constitution of the population of the Province and of the standard death rate of England and Wales, but has nothing whatever to do with the health conditions of the Province.

Next we compare this with the index

twenty and forty (the result obviously of great immigration) and that at these ages, as the thinner lines above indicate, the death rates are very moderate. And the difference of their index death rates shows that the death rate of a population constituted for age as is that of British Columbia would for that reason, quite apart from sanitary conditions, be less than the death rate of the population of England and Wales in the ratio of 12.5 to 16.9, and that to compensate for this different age consti-



death rate for England and Wales, the death rate of the population of 1901 at the mean death rate of 1901-1910. It is given by the Registrar-General as 16.9.

That the index death rate for British Columbia is the lower signifies that the age and sex constitution of the population of the Province is favorable to a low death rate, and is what we would expect from looking at the diagram which shows that an exceptional number of the people of the Province are between the ages of

16.9
12.5,
before they can be justly compared with death rates for England and Wales. This figure, 1.352, is termed the standardizing factor, and remains in use until the population has materially changed its character or a new census has been taken.

Perhaps this will appear more evident if expressed as a sum in proportion.

TABLE I.
BRITISH COLUMBIA, CENSUS, 1911

AGES	Total Population, 1st June 1911			Indians, 31st March 1911			White Population		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
	und. 6 yr.	42164	21152	21012	3423	1707	1716	38741	19445
6-15	53345	27313	26032	3922	1998	1924	49423	25315	24108
16-20	29868	17778	12090	2239	1141	1098	27629	16637	10992
21-64	255664	178154	77510	10928	5454	5474	244736	172700	72036
65 over	7356	4444	2912	1148	516	632	6208	3928	2280
	388397	248841	139556	21660	10816	10844	366737	238025	128712

TABLE II.
PERCENTAGE OF WHITE POPULATION: BRITISH COLUMBIA, 1911

AGES	TOTAL MALES	WHITE MALES	PER CENT.	TOTAL FEMALES	WHITE FEMALES	PER CENT.
under 6	21152	19445	91.9	21012	19296	91.8
6-15	27313	25315	92.6	26032	24108	92.6
16-20	17778	16637	93.5	12090	10992	90.9
21-64	178154	172700	96.9	77510	72036	92.9
65 over	4444	3928	88.3	2912	2280	78.2

TABLE III.
Population of B.C., Male and Female, arranged in the Age Groups
of the English Returns

MALES			FEMALES										
Indian Report Grouping			Intermediate Groups		Registrar-General's (England & Wales) Groups			Intermediate Groups		Indian Report Groupings			
Total	Ages	White	Ages	Numbers	Males	Ages	Fem's	Numbers	Ages	White	Ages	Total	
17911	und.	19445	0-4	16466	16466	0.4	16499	16499	0.4	19296	under 6 yrs.	17966	
3:41	6 yr.	5	5	2979	13935	5-9	13264	2797	5			304	
11821		6 9	6 9	10956	12039	10-14	11453	10467	6.9			11302	
12989	6-15	25315	10.14	12039	12039	10-14	11453	11453	10.14	24108	6.15	12367	
2503		15	2320		14473	15-19	10748	2188	15			2363	
12986	16-20	16637	16.19	12153	12153	20	8560	8560	16.19			9415	
4792			4484		29368	20-24	12671	2432	20	10992	16.20	2675	
25669			21.24	24864	10239	25-34	26894	10239	21.24			11017	
71272			25.34	69090	69090	35-44	18376	26894	25.34			28938	
45007	21-64	172700	35.44	43629	43629	45-54	10754	18376	35.44	72036	21.64	19772	
24923			45.54	24160	24160	55-64	5326	10754	45.54			11571	
10503			55.64	10181	10181	65	5326	5326	55.64			5731	
780			56					447	65			481	
3108	65 & over	3928	66.74	2747	3503	65-74	1979	1532	66.74	2280	65 and over	1957	
1158			75.84	1024	1024	75-84	626	626	75.84			799	
178			85 up	157	157	85 up	122	122	85 up			156	
248841		238025		238025	238025		128712	128712		128712		139556	

TABLE IV.

"Deaths expected in the Province at the English rate:

Ages	MALES			FEMALES		
	Number	Death Rate England & Wales 1901-10	No. of Deaths Expected	Number	Death Rate England & Wales 1901-10	No. of Deaths Expected
0-4	16466	50.	823	16499	41.9	687
5-9	13935	3.5	49	13264	3.6	68
10-14	12039	2.1	25	11453	2.2	25
15-19	14473	3.1	45	10748	2.9	31
20-24	29368	4.2	123	12671	3.5	44
25-34	69090	5.6	387	26894	4.7	126
35-44	43629	9.2	401	18376	7.5	138
45-54	24160	16.2	391	10754	12.5	134
55-64	10181	31.8	324	5326	24.8	132
65-74	3503	64.8	227	1979	53.9	107
75-84	1024	139.7	141	626	119.8	75
85 up	157	279.2	44	122	250.3	38
	238025		2980	128712		1605

I.—The index death rate for British Columbia, 12.5, which is the death rate of the population of British Columbia 1911 at the England and Wales standard (1901-1910) rates, is to

II.—The index death rate for England and Wales, 16.9, which is the death rate of the standard population of England and Wales (1901) at the England and Wales standard (1901-10) rate, as

III.—The crude death rate of the Province, 9.34, which is the death rate of the population of the Province 1911 at the British Columbia 1911 rate, is to

$$\text{IV.--- } 9.34 \times \frac{16.9}{12.5}, \text{ (the fraction is the}$$

"standardizing factor"), = 12.62, which is the standardized death rate for British Columbia, and the death rate of the standard population of England and Wales (1901) at the British Columbia 1911 rate.

A precisely similar calculation gone through on behalf of the population of England and Wales for 1911 ends with the standardized death rate for that population—14.3, the figure we contrast with 12.6 when we desire to form an opinion as to the relative healthiness of England and Wales and British Columbia, the difference in the age constitution of their populations being eliminated.

Standardizing factors and standardized death rates are similarly worked out for every one of the two thousand sanitary administrative districts in England and Wales and we find that British Columbia has a standardized death rate lower than any division of Wales; higher than the rural, lower than the urban division of England and Wales as a whole; and corresponding most nearly with the similar figure for the smaller urban districts in the Midlands. Not a high death rate, but one would have expected a lower for a Province with so magnificent room for its inhabitants. I hope later to be able to discuss the diseases which principally accounted for this mortality, that we may learn how it should be reduced.



THE DUTIES OF A MEDICAL OFFICER OF HEALTH

By JOHN W. S. McCULLOUGH, M.D.

Chief Medical Officer of Health for Ontario

IN the statutory by-law known as Schedule B, which may be found in the pamphlet containing the Public Health and Vaccination Acts, the duties of the Medical Officer of Health are set out in a general way as follows: "It shall be the duty of the Medical Officer of Health to assist and advise the Local Board of Health and its officers in matters relating to public health, and to superintend, under the direction of the board, the enforcement and observance, within the municipality, of health by-laws and regulations, and of Public Health Acts, and of any other sanitary laws, and to perform such other duties and lawful acts for the preservation of public health, as may, in his opinion, be necessary, or as may be required by the Local Board of Health. He shall also present to the Board, before the 15th of November in each year, a full report upon the sanitary conditions of the municipality."

The Health Officer is Executive Officer of the Board, and as such it is his duty to attend the Annual Conference of Health Officers.

Where an Isolation Hospital exists, the Medical Officer of Health, through the local Board, has practically the management and control of it and of the conduct of the physicians, nurses and patients therein.

It may be of interest to point out that in case of an outbreak of communicable disease of any kind, the Medical Officer and Board may take possession with or without consent of the owner of any land or building for the purpose of establishing a temporary isolation hospital. In some municipalities there is either no medical care given to indigents by the municipality or this duty is foisted on the Medical Officer of Health or the profession, generally without remuneration. It is not incumbent on the Medical Officer

of Health to perform such duties without being paid therefor. Communicable diseases reported to Medical Officers of Health should, as required by the Act, be quarantined under his directions and notice immediately given to the secretary of the Board, whereby he may make his weekly return.

The initial regulation for the control of communicable disease points out the diseases that shall be quarantined, and Regulation 4 indicates that in cases of diphtheria, scarlet fever, measles, cholera, bubonic plague, epidemic anterior poliomyelitis, or epidemic cerebro-spinal meningitis, the Medical Officer may permit those who do not have the direct care of the patient to leave the premises in order to attend to their regular duties, except they are employed in the handling or preparing of food or clothing, or are teachers or children attending school.

The necessity for cleansing and disinfection of any house rests upon the opinion of the Medical Officer of Health, and if he decides that such are necessary they should be done at the expense of the municipality, except in such special cases as are provided for under section 62 of the Act.

The Board is often asked the question as to whether a Medical Officer of Health is entitled pay from the municipality for attending cases of communicable diseases. Section 28 of the Act, referring to such matter, says the Medical Officer of Health or Local Board shall make effective provision for the public safety by removing such person to a separate house, or by otherwise isolating him, and by providing medical attendance, medicine, nurses and other assistance and necessaries for him. Sub-section 2 of the same clause says that the corporation of the municipality shall be entitled to recover from such persons

the amount expended in providing such medical attendance, medicine, nurses and other assistance and necessaries for him, but not the expenditure incurred in providing a separate house or in otherwise isolating him. It seems to me that these two clauses mean that the Medical Officers of Health or Local Board may incur all these expenses, some of which, however, may be charged back to the patient. I would advise, however, that in all cases of this kind the Medical Officer of Health should have an additional security of the authority of the Local Board for this purpose. If the municipality neglects to appoint a Medical Officer of Health, or the latter neglects his duties, the municipality could be held liable for an outbreak of disease which may spread from that municipality to another one. (Section 59).

The Medical Officer of Health or some legally qualified medical practitioner appointed by him in writing, is the only one who may legally enter any house or premises for the purpose of making enquiry or examination regarding communicable disease.

It is the duty of the Medical Officer of Health to see that his municipality is regularly inspected in order to prevent or abate any nuisances, and the means of abating such nuisances are set down very fully in the Act under that heading.

One of the important powers of the Medical Officer is that he may close premises which in his opinion are dangerous or unfit for habitation, until such premises are put in fit condition.

The Medical Officer of Health should satisfy himself of sanitary conditions of the slaughter-houses in his municipality. The reports of the District Officers of Health indicate that the conditions of slaughter houses all over the Province are nothing short of scandalous. These premises are often filthy, uneaten offal is being fed to hogs, and conditions are such which, if generally known, would quickly make us all vegetarians. I desire to point out to you that the feeding of uneaten offal, blood, and so on to hogs is entirely against the law, and if the Medical Officer finds this being done it is his duty under the Act to confiscate hogs so fed. Some years ago Mr. Justice Anglin gave his de-

cision, embodying what is meant by a dead animal, and this decision still stands as a precedent. The learned Judge gave as his opinion that a dead animal was a healthy animal which had been slaughtered for food purposes, and that it was not an animal killed by accident or a diseased animal slaughtered for food, and that consequently the latter could not be used for food for hogs, even if cooked.

The by-law known as Schedule B, already referred to, is in force in every municipality until altered by the Council with the consent of the Provincial Board. This by-law gives the Medical Officer considerable powers. For instance, privies, cess-pools and so on cannot legally be established without the consent of the Medical Officer.

Frequently the Board is asked for forms upon which communicable diseases may be reported. These forms are not provided by the Board, but by the municipality as laid down in clauses 29 and 30 of Schedule B.

The Medical Officer should have the closest possible supervision over the milk supply of his municipality. There is probably no other article of food as important as milk in any community. It is the chief food of the early part of a child's life, and if infected may carry incurable disease to children.

He should have close supervision over the sanitary conditions of the schools. These, I believe, are absolutely bad all over the Province. It is time they were made right and the Medical Officer of any municipality has a right to go in on the School Board and demand that the closets, heating, lighting, ventilation, water supply and various conveniences for children shall be established and properly maintained.

Some of the duties which the Medical Officer of Health has to perform are perhaps not very popular with the public, but in my humble opinion, if the Medical Officer tried to improve the sanitary conditions of the schools he would have the support and adherence of the great bulk of the people, especially the women. I think the Medical Officer of Health might do a great deal of service and at the same time popularize his position by visiting the

various schools in his municipality once or twice a year, in order to examine into sanitary conditions and to give short talks to the children and parents upon public health questions. I have no doubt that most of you have come to the conclusion by this time that it is very easy for me to talk about all these various duties which the Health Officer should do, but he has not much incentive to do these duties when his office is so poorly paid. I am ready to admit this, and while the Medical Officer of Health shoul dbe paid sufficiently for what he does he is not likely to have very much advancee in his present pay unless he can show his municipality that he is doing something to earn his money. I have found that some energetic physicians of the Province are doing work following the line that I indicate, and I find that these are the ones who are gradually receiving more adequate pay than formerly. When, as under former circumstances, a Medical Officer of Health was usually out of office

after a year's service, there was no incentive for these physicians to do their duties. Now that the office is secure, there is an incentive to do his duty to make himself efficient in the work of his office.

Flies are known to be prolific carriers of various diseases, such as typhoid fever, tuberculosis, and probably polio-myelitis. This is especially true in densely populated districts. While some relief may be had from them by the screening of windows, doors and privies, an additional and most effective measure is the weekly removal of manure in which these insects breed.

Do not forget that the education of the public is one of the greatest factors in dealing with public health questions. Laws are made easier of enforcement when the public understand the benefit to be derived from them, and the Medical Officer who makes an effort to instruct the people of his community will find his position an easier and more profitable one.



A CHEAP FOOD FOR BABIES

By R. J. EWART, M.D., M.Sc., F.R.C.S., D.P.H.

Medical Officer of Health, Barking

The following brief description of a self-supporting Infant Feeding Depot may be of interest to those who desire to do something to help mothers whose supply of breast milk has failed.

The scheme has one important recommendation which should merit its careful consideration, and that is the small amount of capital necessary to establish it. The novel feature around which all else centres is the nature of the food, and it should be understood that the modified milk which is offered, though not of quite so fine a quality as those already on the market, is yet, in the physiological sense, as near a perfect food as art can produce. Briefly, it consists of dried separated milk to which serum albumen, emulsified fat and dextrose are added, in such proportions that with the right quantity of water the chemical composition is similar to the average composition of human milk.

The only difficulty that has to be overcome is the emulsification of a suitable fat to take the place of the butter fat that has been removed from the dried milk. Actually the process is simplicity itself, and is such that a little thought will suggest.

The casein of the dried milk being a colloidal substance, can be used as a basis in which an emulsion can be suspended, which by a simple mechanical process can be obtained. If the quantity is small, shaking alone is sufficient, but if larger amounts are being dealt with, some form of mixer is desirable. The most important item in the recipe is the fat, which is going to replace the butter fat that has been removed from the milk. The object being to make a mixture which will more closely resemble human milk fat than ordinary butter does, that is to say, something is required which contains a low percentage of stearin and a relative excess of olein.

Fortunately there are two market products, which, combined in a simple way, supply the need remarkably well. "Oleo," is an ordinary suet from which the stearin

has been separated by fractional crystallization. It is used almost solely in the manufacture of margarine, and in both appearance and taste, has much to recommend it for our purpose, though its melting point is still too high. The addition of one part pure olein (refined cotton seed oil) to three of Oleo makes a fat which as regards melting point and gross chemical composition is about as close an imitation of human fat as can be produced artificially. This composition, when melted and mixed with dried milk and glucose, produces a milk of a white and pleasing appearance. The actual mixing is done in an ordinary cake mixer, which suits the purpose admirably, and takes about 10 to 15 minutes to make a suitable emulsion. In the first instance only a small quantity of water is used sufficient to form a thick paste. Further dilution is necessary to produce the final product, which may be done without any fear of the fat separating beyond such that occurs in ordinary milk.

The details for deducing the quantities of dried machine-skimmed milk, Oleo, cotton seed oil, glucose and dried sheep's blood albumin, to produce a synthetic infants' food is as follows:—

	Human Milk.	If Dried.
Fat	4.0 parts	31.5 parts
Sugar	7.0 parts	55.1 parts
Proteid	1.5 parts	11.8 parts
Salts	0.2 parts	1.6 parts
Water	87.38 parts	— parts
	100.08 parts	100.00 parts

II.

Dried cows' milk usually contains from 5% to 8% moisture, according to atmospheric conditions:—

Machine Skimmed Dried Milk	If completely dried	11.8 parts proteid are required. Hence with that quantity there will be
Fat	0.88	0.92
Sugar	49.12	51.57
Proteid	36.12	38.97
Salts	8.37	8.78
Water	5.6	—
	100.99	99.34
		31.23

Therefore, 31.23 parts dried machine skinned milk contain 11.8 parts proteid, which is the amount required in 100 of the mixture. Hence 31.2 parts fat and 38.85 parts sugar must be added, thus:—

Parts.	added	Parts.
Fat	0.31	fat necessary 31.02—31.51
Sugar	16.25	sugar necessary 38.85—55.10
Proteid	11.87	11.87—11.87
Salts	2.81	2.81—2.81
	<hr/>	<hr/>
31.24		101.69

As dried milk contains about 5% of moisture 31.24 should be increased to 33 parts, and glucose contains 18% of moisture (the sugar used), 38.85 should be increased to 42 parts.

Human milk contains 12.7% of solids. Hence to make 100 ozs. of milk, take— 3.96 ozs. dried milk without moisture and 4.16 with 5% moisture.

3.95 ozs. fat.
4.93 ozs. sugar (glucose) without moisture,
6.00 with 18% moisture.

In round figures, the quantities may be taken as follows: 4½ ozs. dried milk, 4 ozs. fat, and 6 ozs. glucose as purchased.

To make a close imitation 15% of 4½ ozs. dried milk should be replaced by sheeps albumin, as natural albumins are more abundant in human milk. This addition is not essential and if cost is a consideration it should be left out. Lastly, the 4 ozs. of fat should consist of 3 ozs. "Oleo" and 1 oz. cotton seed oil.

As an example, we will suppose that 2 gallons, or 320 ozs. of milk are desired, the procedure is as follows:

1. Weigh out 16 ozs. of dried milk. If it is desired to reduce the amount of casein, 13 ozs. dried milk should be taken and 3 ozs. of dried sheep's albumin.

2. 16 ozs. of glucose. This, as supplied, contains 18% of water, for which allowance is made.

3. 15 ozs. of fat, which should consist of 9 ozs. Oleo and 6 ozs. cotton seed oil.

4. 10 to 20 grains of bi-carbonate of soda or phosphate of soda, according to the acidity of the dried milk or the initial mixture may be made with 10% of lime water.

5. Place all ingredients in the mixer and add sufficient boiling water to make a thick paste; then mix thoroughly for 15 minutes.

6. Add sufficient boiling water to

make the total quantity up to 1 gallon.

7. Serve out in bottles, giving instructions to the mother to add an equal quantity of warm water to make the necessary feeds.

The cost for the quantity given is as follows:—

Dried milk at 31s. per cwt. (16 ozs.)	3d.
Fat (consisting of Oleo at 6½d. per lb. and cotton seed oil at 4d. per lb.)	5d.
Glucose at 2d. per lb. (18 ozs.)	2½d.

Total cost of ingredients in 2 gallons.. 10½d.

which equals a cost of 0.64d. per pint. If the quantity is large (and 100 babies are being fed) they would require 130 pints of food, which if supplied at 1d. per pint will yield 3s. 9d. over cost of ingredients used. This amount can be made in about 3 hours, so that such charges as gas, labor, etc., could be met if this number were being dealt with. In the district where this food is being used the number of babies supplied averages about 14. The time taken for making and distributing, is approximately one hour and the profit made over cost of ingredients is a little over 4d. per day, so that with small quantities the profit hardly covers the extra costs. Unfortunately, voluntary labor is hardly desirable, as the duties demanded are of a rather onerous nature, and involve an attendance at the centre on all days of the week.

Taking a batch of 25 babies, all of whom were in the first instance suffering from some form of complaint, I find that 16 were solely fed on this food and 9 partly breast and partly artificially fed. After a period of 2 to 5 months, 14 are still taking the food well and gaining on an average of 5½ ozs. per week. This experiment has, I think, demonstrated that a perfectly suitable food can be made and sold at 1d. per pint, and if the number supplied is fairly large, say over 50, this price will meet all charges. The average cost of feeding a baby under 12 months is approximately 10d. per week, which is lower than if modified cows' milk or any proprietary food at present on the market is used. We are thereby enabled to insist on certain standards of parental care as regards cleanliness and clothing, which would be hardly feasible were we simply to restrict ourselves to visiting only.

THE REALM OF THE HAPSBURGS

By FLORENCE WITHROW

(Continued.)

AFTER the act of throwing the barons from the window, which partially precipitated the Thirty Years' War, Archduke Mathias died and was succeeded by his cousin, Duke Ferdinand II. of Styria. On account of the latter's coercive measures a confederacy was formed of the states of Bohemia, Moravia and Silesia to maintain their civil and religious rights and to declare that Ferdinand had forfeited his Imperial office, which they offered to Frederick V., Elector of Bavaria. Under Count Thurn these Protestant States joined forces and marched upon Vienna, but Ferdinand hastily procured assistance from Phillip III. of Spain, the Pope, the King of Poland and Louis XIII., and a decisive battle was fought in which Ferdinand was victorious, so Frederick had to renounce all pretensions to the Imperial crown. A night of terror ensued (Jan. 21, 1621), when 23 Protestant leaders were executed and the estates of Count Thurn confiscated.

Meanwhile the English persuaded Sweden and Denmark to help the Protestant Princes regain Bavaria and Bohemia, but the armies under Gustavus Adolphus of Sweden and Mansfield of the Palatine were far outnumbered by the Imperial forces under the blood and iron commanders, Tilly and Wallenstein, hence the Protestant States were forced to sue for peace.

Ferdinand now set about extirpating the heretic religion, and from Austria it was soon practically abolished, while in Bohemia the ancient spirit was so completely crushed that the people never again became an independent nation and massacres and persecutions wrought their worst, a fate which likewise befell Moravia.

In 1629 Ferdinand issued his monstrous Edict of Restitution, restoring all ecclesiastical and civil power to the Roman Catholics, but so frightful were his injustices that even the Catholics recoiled against

the Emperor's enormities, and later demanded the suspension of the Edict, the dismissal of Wallenstein and the disbandment of the army.

Immediately following the issuing of the unjust decree, Gustavus Adolphus renewed hostilities, and was met at Lutzen near Leipzig by a superior force under Wallenstein. The Swedish King was mortally wounded, but the doughty Swedes, with their staunch allies the Saxons, although enduring untold hardships, totally defeated the Imperialists. Two years later Wallenstein, who was deprived of office on account of his arrogance and ambition, was assassinated by a Scoteman named Gordon.

The Emperor's son, Ferdinand III., who had been elected King of Hungary, now became commander-in-chief, and the weary war of hate dragged on with alternate victory and defeat for both Catholics and Protestants, and with bloodshed and devastation unequalled in European history, save in the barbarous slaughter and ruin of to-day. At last, when all were worn out, the Peace of Westphalia was declared (1648) in Prague, where the struggle had begun, and thus was ended the ironical Thirty Years' War, a so-called Holy War. The distribution of territories which followed resulted in few changes, but civil and religious rights were established for all.

At the end of Ferdinand's reign a new enemy appeared in Charles Adolphus, nephew of Gustavus, who threatened the balance of power by invading Poland. Ferdinand negotiated an alliance with Denmark and Brandenburg to prevent Swedish aggression, but just as the Imperial army was about to march to the north he died.

His eldest son having died, the next, Leopold I., aged 17, succeeded to the Austrian domains, but his right to the Imper-

ial crown was contested. Cardinal Mazarin, minister of Louis XIV., was the chief opponent, as he wished to support the Grand Monarque, however the choice fell to Leopold I, 1657. As Emperor his power was greatly curtailed by a confederation of northern states headed by Sweden, for the purpose of preventing Austrian aggression in Poland and Jutland.

Events next led to the war of the Spanish Succession by Leopold marrying the second Infanta, but Louis XIV., had previously married the first Infanta, through whom he laid claim to the Netherlands, into which he poured French troops. Warring continued with France, Sweden, England and Brandenburg on one side and Austria and Spain on the other. French power was never more triumphant than at this time, extending even to predominant control in Alsace and in the southern Netherlands, the northern, or Holland, being ruled by the Stadholder William of Orange. Leopold was forced to sign the Peace of Ryswick, dictated chiefly by France, 1697, but this did not close the war.

Trouble with the eastern portion of his Empire was one of the factors which prevented Leopold's successful coping with France. Conditions among the Hungarians had been unsatisfactory for years, and many were the conspiracies to throw off the Austrian yoke which imposed on them a military government and abrogated their rights to choosing their own king. The insurgent party procured aid from Transylvania and forced Austria to a general amnesty. At the same time, 1683, the Turks besieged Vienna, which was saved chiefly by the help of John Sobieski, king of Poland, whom the Austrians praised as the saviour of their country.

The Hungarians, although seditious for years, were compelled to entreat Leopold's clemency, and forthwith he seized the advantage and forced them to accept his son Joseph as hereditary king, 1687.

The Turk being by no means silenced, fresh Imperial armies under the intrepid Prince Eugene of Savoy were brought to slaughterous encounter with this barbarous enemy, the result being the most effective setback the Turk had yet had in Europe, 1697.

As before stated, the Peace of Ryswick did not settle the Spanish succession, which, after intricate manipulation, fell to the Duke of Anjou, the Dauphin of France, grandson of Louis XIV., who assumed the title Philip V. of Spain, 1700, but Austria did not acquiesce in this succession, and revived her claim. By this time England veered around to the Emperor's side, and gave support by sending Marlborough, who engaged in campaigns in the Netherlands, while Eugene of Savoy fought France and Spain in northern Italy. Crushing defeats attended the French at Blenheim, Ramillies, Oudenarde and Malplaquet, and finally they were expelled from Germany and Italy. As a result Leopold's second son Charles was proclaimed King of Spain with the title Charles III., 1703.

At the same time the Austrians defeated the Hungarian leader Ragotsky, who had been incited by France to attack Vienna, and the Magyars were obliged to recognize the authority of Austria and to acknowledge the Archduke as their King. Leopold the Great died (1705) after a reign of thirty-eight troubled years, and was succeeded by his son Joseph I. (1676-1711).

The war of the Spanish Succession dragged on even though Charles III. actually took up his residence in Madrid and defeated Philip V. at Almanza and Saragossa. However, reinforced from France, Philip gained the ascendancy once more, even though having to fight the English, who had just acquired Gibraltar, and Charles was forced to leave Spain. His brother Joseph dying (1711), Charles succeeded as Archduke of Austria and as King of Hungary and Bohemia. He was also crowned at Frankfurt, the seat of the Imperial Diet as Germanic Emperor Charles VI. (1685-1740).

His wish still was to prosecute the war with France and to depose Philip V., but by the Treaty of Utrecht, 1713, Philip was confirmed in his tenure of the Spanish throne. By this treaty Louis XIV. acknowledged Anne as Queen of England, expelled the Pretender from France, and ceded to the British Nova Scotia and Newfoundland. Philip, as the second son of Louis XIV.'s son, who had died, renoun-

ed all claim to the crown of France, but established the Line of Bourbons in Spain. To Austria was ceded the Duchy of Milan and the Kingdom of Sardinia, which she harshly treated for over a hundred years.

Once again the Turks had to be dealt with, so under the veteran Prince Eugene a decisive battle was fought near Belgrade (1717), with the result that Austria secured much Turkish territory, including Serbia and Bosnia.

Since Charles VI. had no sons, he manoeuvred, on the advice of Count Zinzen-dorf, to frame a new law of succession—the Pragmatic Sanction—whereby his daughters were named rather than those of his brother Joseph.

During these years the power of Britain and of Prussia greatly increased, the former ruling the sea and the latter equipping the best army, but in the various alliances of the European States Great Britain's influence was zealously sought.

As to Austria, hostilities continued with Spain, Sweden and Holland, and even with Russia under Peter the Great, but they are too involved for citation in this brief sketch, although one result must be mentioned, the passing of Austrian power from the Two Sicilies to that of the Spanish Bourbons under Philip V.'s son, Don Carlos III., 1734.

Two years later Charles V.'s eldest daughter Marie Theresa, a lineal princess of Alsace, married Duke Francis Stephen of Lorraine, their paternal ancestor having been the founder of the Hapsburgs, thus the two ancient duchies of Alsace and Lorraine were again united. The warrior Eugene having died 1736, Duke Francis was given command, but he was not a born general, and the Imperial army was at its lowest ebb. Small wonder then that the next Turkish invasion proved disastrous to Austria, and that the Ottoman power encroached further into Europe until it held all of Serbia and Wallachia. The dying Charles' last word was "Alas for Belgrade!"

His spirited daughter, Marie Theresa (1717-1780), aged 24, no sooner succeeded to the dominions of the House of Austria than she found rival claimants, notably the Elector of Bavaria. Frederick^{*} II. (Great) of Prussia also laid claim to certain duchies and, bent on aggrandisement,

prepared his plans in secret and immediately seized Silesia. Knowing Austria's weakness, he made monstrous demands, to which the courageous young Empress would not concede. Consequently a cruel and devastating war was begun, and Austria's veteran troops met repeated defeat. The Elector of Bavaria also invaded Austrian territory, aided by French troops, and frightfully decimated the Imperial army. On account of Britain's connection with Hanover (George I.) and the consequent fear of offending Prussia, the English Government effected a shameful neutrality.

Although in desperate straits Maria Theresa's courage never failed, and in spite of delicate health, forthwith she journeyed to her Hungarian capital. Presenting her new born son to the States Assembly she declared that in them remained her sole hope of success. Immediately a cry of exultation arose, and with swords drawn from the scabbard, then thrust back to the hilt, the loyal Hungarians exclaimed, "We will die for our King," Maria Theresa."

Their valor was soon put to the test in a desperate engagement with the Bavarians who at Linz actually inaugurated their Elector as Archduke of Austria, and a few days later entered Prague and proclaimed him King of Bohemia. Shortly afterwards France succeeded in wresting the Imperial crown from the Hapsburgs and placed it on the Elector's (Charles VII.) head at Frankfurt, 1742.

Endurance if not tenacity proved the better part chosen by Austria-Hungary for the next year they regained Bohemia, and in the old beleaguered city of Prague Maria Theresa was crowned as their Gypsy Queen.

Two years later Charles VII. of Bavaria died and Austria's lost prestige was restored in the election of the Duke of Lorraine as Emperor Francis I., Maria Theresa leading in the shouts of joy at her husband's acclamation.

Thus Austria's star arose again, but she made an unnatural alliance with France, her former foe, in order to recover Silesia from Frederick the Great. The proud Empress even stooped to write a friendly letter to Louis XV.'s mistress, the Pompa-

^{*}Prussians and Austrians each numbered at this time only about 20,000 soldiers, but at the end of his reign there were many more, Prussia superior in infantry, and Austria in cavalry.

dour, in order to gain French support. She also secured the services of Poland, Saxony and Russia against Prussia and Britain. Thus was begun the Seven Years' War. The utter woe and devastation of this period is paralleled only by present events, for Prussian barbarism is not of to-day only. Frederick the Great was a master of stratagem and quick manœuvre, but he was bloodthirsty and merciless. True, he was surrounded by enemies and had to rush from Swedish attacks in Pomerania to Russian invasion on the east, from French advances across the Rhine to Austrian aggression in the south, yet he wrought ruthless destruction and wholesale slaughter. The Prussian is a Hun and has shown Hun's traits throughout all Prussian history.

After peace was concluded, which left Prussia with less than she had "grabbed," although with extended territory, Francis I. died (1764), and Maria Theresa succeeded in having their son elected as Emperor Joseph II. (1741-1790). The warrior Queen, who had done so much to raise the standard of her army and to hold her hereditary domains, lived fifteen years longer, but she resigned the government to her son and devoted her time to bettering the people educationally and commercially. In spite of a contentious and arbitrary nature, she was a great ruler and a "King" in very truth. Womanly traits of highest excellence she possessed, making her devotion to her husband ideal, even though her treatment of her children was severe. She mourned his loss until her death and spent hours in the royal vault in reflection and prayer.

After Joseph's succession an event occurred which was a disgrace to all parties participating, in that Poland fell a prey to the avarice of Russia, Austria and Prussia, who annexed to themselves generous slices of the stricken country. This iniquitous act was called the First Partition of Poland, 1772.

Austria prepared for further aggrandisement by proposing to Frederick the Great a like partition of Bavaria, but Prussia, jealous of Austria's restored power, prevented this. By a strange irony, Prussia and Russia, who had long been Austria's enemy, became her nominal

friends, and Joseph II. visited the worn-out "Fritz" at Sans Souci and the manish Czarina Catherine II. at Peterhof. In the following year Maria Theresa died aged 64.

Joseph II., who had pleasant manners but overweening conceit, immediately set about making changes in Church and State, and Roman Catholicism was again declared the State religion, although many prerogatives were taken from the Papal See. An Edict of Tolerance was granted (1781) to all religions, even to the Jews, who had been persecuted throughout all Europe. Latin and Hungarian tongues were abolished as official languages and were replaced by German. Joseph sought to have one central administration to control the many diverse nationalities of his realm, and even removed from Pressburg, the former capital, all the Hungarian emblems of sovereignty.

The greatest blow to Austria's prestige soon followed in the loss of the Netherlands, where her control had been largely one of misrule. In consequence a Belgian confederation was formed (1790), and exactly a month later Joseph II. died, aged 49. He bequeathed to his brother Leopold II. (1747-1792) the perennial struggle with the Turks, which was settled for the time being by the memorable treaty of Sistova, whereby Leopold renounced his various Turkish conquests.

Then seeking to pacify the Hungarians who revolted against Joseph's stern laws, he restored to them a measure of their ancient privileges, and promised to live part of every year at Buda. Leopold II. next turned his attention to recovering Belgium and entered Brussels with a large army, hence at the end of 1792 the Provinces were again under Austrian rule.

Meanwhile the Revolution in France led Leopold, who was a brother of Marie Antoinette, to try to negotiate with the other Powers for peace, but this resulted only in Austria's alliance with Germany, while Britain remained neutral. Leopold died before his ill-fated sister met her doom and was succeeded by his son Francis II. (1768-1835).

Although in the throes of revolution, France compelled Louis XVI. to declare war against allied Austria and Prussia.

Consequently, under the Duke of Brunswick, the allies found themselves fighting the new Republic, but the French commander Dumouriez proved so able a general that the Austrian Netherlands fell once more into the hands of France.

As to Poland, without any contest of arms, but with merely an Imperial manifesto from Francis II., this already partitioned country was once more divided (1792) among Russia, Prussia and Austria, the last-named profiting least, as her particular wish was to exchange a bit of Poland for Bavaria and Alsace. To her surprise Prussia suddenly withdrew from the coalition against France, in which Britain and Holland had joined, and Prussian troops occupied Alsace to prevent Austria realizing her ambition.

The time had now come for the Austrians to cope with a young artillery officer, twenty-six years of age, Napoleon Bonaparte, who commenced his campaign in northern Italy, at Rivoli, near Milan, where he won his first victory. The Austrian army becoming strengthened by levies from Hungary and the Tyrol, Buonaparte feared to be cut off, so proposed a Peace, signed at Campio Formio, by which the Austrian Netherlands were ceded to France, also the left bank of the Rhine and Savoy, while to Austria fell Vénice, Istria and Dalmatia.

The French Republic had triumphed and Napoleon had established his generalship, which next year he carried to Egypt, 1798. Returning the following spring he gave battle to the Austrians at Marengo, June 14, after which they renounced Piedmont, Lombardy and Genoa. A few months later Austria's boundary in Italy was fixed at the Adige and the independence of the Cisalpine Republic was proclaimed, also that of the Batavian Republic, as Holland was called under the French regime from 1795 to 1806, when Napoleon erected it into a Kingdom, with his youngest brother Louis upon the throne.

Napoleon's power waxed to such an extent that on May 18, 1804, he assumed the title of Emperor. This occurrence excited the Imperial jealousy of Francis II., who foresaw that the House of Austria might some day fail to acquire the Germanic honor of being called Emperor,

hence he proceeded to insure the Imperial title in hereditary succession for the House of Hapsburg, and on August 11 had himself duly proclaimed Emperor of Austria, on which occasion Haydn's noble hymn was first sung as the new national anthem.

Although Austria greatly desired peace she saw that Napoleon, who was at the zenith of his glory, had no such intentions, consequently in spite of vast coalition armies of British, Dutch, Swedes, Russians and Austrians against France, the Austrians met a decisive defeat at Austerlitz, 1805. As a result Austria had to give up Venice and its territories to the Kingdom of Italy, which recognized Napoleon as King.

But the most disastrous consequence of Napoleonic sway was the complete disorganization of the Germanic Empire. In 1806 a treaty was signed in Paris by the heads of the twelve sovereign Houses of the Empire, declaring themselves forever severed from authority of the German Emperor and united, under the protection of the French Emperor, as the Confederation of the Rhine, with a Diet at Frankfurt, so long the seat of the old Imperial Diet. Such was the end of the Holy Roman Empire, which Gibbon says was never holy, Roman nor yet an Empire. Francis II. forthwith resigned the Germanic title and proclaimed himself Emperor Francis I. of Austria.

The loss of the Tyrol at this time weighed heavily on the Austrian ruler. As to the Confederation of the Rhine, Prussia viewed it as an insult, since she was not consulted, and Russia likewise resented Napoleon's scheme of universal Empire, but what especially outraged both was Napoleon's restoration of Hanover to Great Britain. Immediately Frederick William of Prussia sent an ultimatum to France, which resulted in a renewal of the war, with defeats for Prussia, Austria and Russia at Jena and Auerstadt in 1806 and at Eylau and Friedland in 1807. The Peace of Tilsit which followed left Napoleon absolute lord of the Continent.

Occupying Berlin for three years he issued his Berlin Decree against Great Britain, Prussia and Russia, and his Milan Decree against Austria and Italy. His

commercial blockade against the British left them practically isolated from every port in Europe. However, they retaliated by keeping Napoleon busy in the Peninsular campaign in Spain.

The Austrians having gained strength declared their grievances against the "war lord," and the Tyrol was the first to rebel against French aggression, led by the Tyrolese hero Andreas Hofer, who with his doughty band drove out the invading troops. Meanwhile Napoleon was more successful in Austria, and for a second time took up his quarters in Schonbrunn, the royal summer palace near Vienna. He dissolved the Landwehr, or new Austrian army, and proclaimed Hungary independent. A series of fierce battles ensued, notably that of Wagram (1809), after which Austria sued for peace, which resulted in ignominious terms for her and fresh concessions to France, including Croatia and Dalmatia, while East Galicia was ceded to Russia and Bohemia and West Galicia to Saxony. Andreas Hofer and his brave comrades were court-martialed and shot, and the Tyrol was forced to resign again to French mastery, 1810.

Hostile feelings were for the time slightly checked by Napoleon's marriage with the Archduchess Marie Louise, daughter of Francis I., after his having first sought a Russian Grand Duchess and a Saxony Princess. A year later the heir for whom he had married was born and was given the title, King of Rome.

Peace did not long continue, for in 1812 Matternich, the Austrian minister, in alliance with Great Britain, Russia and Prussia, again declared war against France. Bavaria dropped her old hostility toward Austria and joined the alliance, and Holland also revolted and tore down the

French flag. The Allies entered Paris March 31, 1814, and declared they would not treat with Napoleon, but with the legitimate King of France, whereupon the self-imposed Emperor was obliged to abdicate and retire to Elba April 20. The Peace of Paris followed, whereby Austria regained her northern frontier, and the Kingdom of Sardinia was restored to Victor Emanuel I. Murat, Napoleon's brother-in-law, whom he had placed on the throne of Naples, was forced to resign and was afterwards shot. The Austrians repulsed the Neapolitans and restored Ferdinand IV. of Sicily after his nine years' absence. In Napoleon's final defeat at Waterloo, 1815, the Austrians were too far away to give aid, but they assisted the allies by overrunning Alsace, which was hostile to them.

The long standing animosity between Bavaria and Austria was finally changed to friendship by Francis' second marriage with a Bavarian princess. Gradually financial conditions improved after the long drain of war and a National Bank was created, causing industrial activities to increase.

By a curious coincidence, in the Kaiser Saal in Frankfurt the last space was filled with the portrait of Francis as German Emperor, also in St. Stephen's Church, Vienna, the last niche of the Emperors was filled by Francis' marble statue. This was taken to indicate that not only the dominant Germanic Imperial power, but also Napoleon's was to cease and instead a league of independent States was to be formed, 1819. Thus the Corsican's dream of Empire was short lived. "World dominion" was not to be a century ago, much less will Europe tolerate it to-day.

(Concluded next month to present times.)



For a year we have been hoping to call attention to this most excellent paper by Dr. Thomas F. Harrington, of Boston. It is sufficiently important to warrant its publication

Prevention of Disease vs. Cost of Living. In full, only our space requires that we divide it into two portions. The second will appear next month in these columns.

It is now pretty generally accepted that the increase in the cost of living must be reckoned with as a necessary consequence of the social, economic, and political development of the world. The problem is made up of so many complex items that little hope need be expected that a reduction in the cost of the several factors is likely or possible. Neither is there much promise of success in a fight to reduce the total cost of these various component elements. The situation is quite analogous to that which has developed in preventive medicine. Here we have found that germs of disease and microbes are so numerous and are so ubiquitous that their complete eradication is impossible. Some of them are helpful to health; others are powerful allies in combating certain diseases if rightly marshaled. The successful campaign against the harmful germs has been so to raise the inherent fighting power of each human being that the attacks from germs cannot get by the person's defense, that is, by his asset of health, or health income. Each person has within himself this resistant power to disease. Modern medicine consists greatly in bringing it into action. In the fight against tuberculosis alone, it has resulted in a reduction of deaths, in Massachusetts, of 45 per cent. since 1880. If the same principle is applied widely and in accordance with established facts in medicine, so that

individuals are enabled to develop a greater working power, both in quality and in quantity, the increase of each one's wage income would exceed, or at least keep pace with rising prices. This would defeat the most powerful factor making for discontent, discouragement, and failure in the battle for life to-day. It would substitute for inefficient and unsatisfactory existence a happy, healthy, better living with which to meet the problems of high cost of living and present-day discontent.

There are two facts, however, which must be stated plainly to avoid misunderstanding. The first is the absence of a fixed normal standard of living for all classes of society; the second is that one hygienic advantage may be bought by a hygienic sacrifice in another direction. As an example of the latter, we find that people living under conditions which suggest unhygienic modes of life are often remarkably free from disease, and their children survive attacks of those infant diseases so fatal to a large number of babies each year. These people spend much time out of doors in the sunshine and fresh air. They are less dependent than others on housing conditions; consequently they can spend a greater proportion of the annual income on food, etc. This fact is often overlooked in dealing statistically with the cost of living, especially with the problem of housing conditions.

Stated briefly, a normal standard of living may be defined as that which permits each individual to live as an efficient, healthy human being—morally, mentally and physically. This definition simplifies greatly the whole problem of the cost of living and reduces it to a consideration principally of two factors—health and efficiency. All economists to-day agree that the greatest asset of any country is the vi-

tal efficiency of its citizens. Moralists and physicians agree that this factor has a direct relationship to morals and to mental efficiency. Furthermore, both assert that the conservation of the physical efficiency aids greatly in conserving the moral and the mental standard of society.

It is my purpose to point out some of the methods which modern medicine offers as a means to promote health and, so far as efficiency is dependent on health, to promote efficiency.

It is unnecessary to relate here the marvelous development of knowledge in all branches of science during the past century. The century has been justly termed the renaissance of science. In this medicine has profited greatly. The empiricism of former years has given place to facts based on careful clinical observations and on well-tested laboratory findings. This expansion and deepening of science has fortunately developed in medicine a higher reverence for and open acknowledgment of the spiritual and the humane. This has given to modern medicine a genuine altruism. The application of these various facts constitutes preventive medicine.

The more clearly one sees the whole field of preventive medicine, the stronger the conviction that all the problems are social problems and that they must be solved by social remedies. This is at once evident when we recognize, first, that the responsibility for the conditions that cause these diseases lies with the people and, secondly, that all the power and authority for bettering conditions also rest with society and its agents. It is a popular belief that the control and the prevention of disease are largely a duty of the medical profession. This is not true. The medical profession can and does furnish the technical information as to how disease can be abolished or at least reduced. The physicians can point out the way, but they cannot, of themselves, accomplish anything permanent without public support. This support, this co-operation can come best when the public understands what is needed and why it is necessary. Public education, therefore, becomes an indispensable and a necessary factor in every movement for conserving health.

It adds to rather than detracts from the gifts of Jenner, Pasteur, Koch, Behring, and others to assert that their discoveries

in medical science were comparatively of small value to humanity until the public was educated in the value and the significance of these wonderful achievements. To-day the results are manifest in the reduction of some diseases almost to nothing, as yellow fever and smallpox; in robbing epidemics, as diphtheria, plague and cholera, of their terrors; in lessening the sufferings and the economic loss in quarantine; and, finally, in developing a happier, healthier, longer-lived community the world over. Each day the force and the wisdom of Pasteur's declaration that no human being need die of a parasitic disease is more appreciated, especially as the public comes to realize the enormous unnecessary waste of health, efficiency, and life itself yet prevailing and due greatly to causes which are preventable.

Some one has lately very appropriately placed preventable ignorance in the same list with the three other great preventable and unnecessary wastes, namely, preventable deaths, preventable sickness and preventable conditions of low physical and mental efficiency.

In reporting on the cost of living, the Massachusetts commission had this to say on this point:

"The increased vital efficiency of the citizens of this state which would result from a conservation of the present waste of health would, if expended in labor, increase the earnings of those whose health is impaired and also lessen the burdens of those who are at present unnecessarily ill. This increase in earnings would thus tend to reduce the cost of living, increase the total earnings of the citizens, and make the average income larger."

The commission asserts positively that there is no direct relation between the waste of health and the recent rise in prices; and furthermore, that there is no evidence that the waste of health lowered the rate of wages. It is very evident, however, that sickness, if long continued or often repeated, lowers the efficiency of the individual, and this lowered efficiency means, sooner or later, a reduced income, often a new and less permanent job. Conservation of health, therefore, means higher wages and this enables the workers to keep ahead of the increasing price of the commodities of life.

The extent to which health may be conserved and the number of accidents and deaths that can be prevented to-day seems incredible. The testimony of all those who are competent to judge agrees that on a very conservative estimate, 42.3 per cent. of the deaths each year might be postponed; that at least 50 per cent. of the cases of serious illness are preventable; that the average human life is capable of being prolonged 12.3 years; that 4 per cent. of the population of Massachusetts are on the sick list all the time, with an average loss, to each individual in the state of the equivalent of two weeks' wages each year. Stated in dollars and cents, this means that families and the state suffer an annual loss of fifty million dollars because of preventable deaths and preventable serious illness—a per capita loss, each year of fifteen dollars. This startling unnecessary waste does not include the economic loss of the 12.3 years that are sacrificed to indifference, ignorance, and neglect in applying the lessons which preventive medicine makes possible.

These great unnecessary wastes of human life and efficiency, affecting the cost of living and which are greatly preventable, may be grouped as follows: (1) preventable accidents; (2) preventable illnesses, and (3) preventable deaths.

Under the head of preventable accidents we are rapidly accumulating a mass of testimony the application of which to preventive measures should reduce greatly the risk and hazard of industrial life. Occupations are now being classified on a basis of relative risk to the workers. While it is true that many occupations will always carry with them unavoidable risks, nevertheless it can be claimed, without fear of successful contradiction, that there is not one of these occupations in which the hazard and risk of accident cannot be reduced to a minimum. The reports of the committee of the National Association of Manufacturers and the Interstate Commerce Commission show that in this country there were 500,000 workers incapacitated or killed by accidents incidental to industrial life in one year. The fact that 11,800 persons, employes and others, were killed, and 111,000 maimed on our railroads is in striking contrast with the reports from the industries of Germany, where the established facts of preventive

medicine are applied. Since July 1, 1912, there has been in operation in this state a Workmen's Compensation Act. In six months over 52,000 accidents have been reported. The provisions of this act and the exceptionally high personnel of the commission justify a most optimistic view with regard to future prevention of the great loss of health, limb and life. It has been the experience in Germany—and in states in this country—that the adoption of this line of insurance has led to the installation of safety devices by employers which have reduced greatly the number of accidents. In the meantime, much progress can be made by instruction in the prevention and the avoidance of dangers incidental to industrial life. This is very necessary to-day insomuch as the trend of public education is toward greater emphasis on vocational training. Children now being guided into the various lines of vocational life should be given a word of warning or caution on its possible dangers. Laws may compel the employers to protect the employe from exposed machinery, from dangerous fumes or irritating dusts but no law can compel operators in rubber factories, for instance, to wash their hands, or prevent operatives at this work from eating and drinking in the work-room. Neither can laws adequately protect the employe from accident from electricity when this element is a necessary and often unavoidable source of danger. Instruction in prevention is here more important than labor laws for either protection or compensation.

Undoubtedly the three great factors besides ignorance which promote industrial accidents are defective hearing, defective sight and fatigue. Many failures, both in health and in efficiency, are due to poor sight or hearing. Persons with either defect are as clearly out of place at many lines of industrial life as a color-blind person would be as engineer, pilot or color-mixer. Many occupations increase these defects. Accidents must result sooner or later.

One of the immediate results of the application and future extension of the Employers' Insurance and Workmen's Compensation Act must necessarily be that great attention will be directed to those physical defects which tend to increase industrial accidents, especially de-

fects of vision and hearing, and a large majority of which defects are remedial and curable.

The influence of the factor of fatigue in causing industrial accidents has not received the attention it deserves. The amount of unnecessary fatigue among all classes is not appreciated. Professor Fisher states that 5 per cent. of all persons in this country are fatigued to a degree sufficient to totally impair their working powers. Every physician—conversant with industrial life in our great manufacturing centres recognizes the constantly recurring accidents which occur daily in the mills and workshops. These accidents occur with a clock-like regularity at certain hours of the day, a time of the day when the fatigue factor is most active. This fact has been carefully worked out in the German insurance tables and is as follows:

Time .	Accident Per Cent.
6 to 7 a.m.	2.82
7 to 8 a.m.	5.16
8 to 9 a.m.	5.29
9 to 10 a.m.	6.04
10 to 11 a.m.	10.37
11 to 12 a.m.	10.31
12 to 1 p.m.	3.81
1 to 2 p.m.	4.84
2 to 3 p.m.	6.73
3 to 4 p.m.	8.07
4 to 5 p.m.	7.65
5 to 6 p.m.	8.48

From a very intimate knowledge of industrial life in the largest manufacturing city of this state, I have no hesitation in designating fatigue as one of the great factors in accidents of factory life. Fatigue has also a direct bearing on the susceptibility of the individual to disease. It lowers the whole tone of the nervous and muscular systems. It is a great evil not yet sufficiently recognized as a factor in undermining health and efficiency. It can be prevented almost wholly. Fresh air, good ventilation, avoidance of overheated workshops, enforced periods of rest interspersed in daily life, especially at midday, outdoor exercise at noon rather than confinement in vitiated room atmos-

sphere, a more rigid inspection of industrial and mercantile conditions of employment, a strict enforcement of laws relative to hours of labor, especially those relating to women and children, and a proper regard for sanitary and toilet accommodations will reduce almost to zero the evil possibilities arising from fatigue. The simple exercises of physical training—now taught in the schools—should be given such a definite meaning to the pupils that each child carries into industrial life an appreciation of the value of these simple means to promote better circulation and respiration.

Preventable Illness: (a) Occupational Diseases.

Besides the accidents incidental to many occupations, certain diseases have become so closely associated with certain lines of industries that they are known as occupational diseases. Some of these industries have been designated as "dangerous trades," and the State Board of Health in this state is enjoined by the legislature to safeguard in a special manner the health of employes at these trades. Minors under 18 years of age are prohibited from entering certain specified trades of this group. Already the Board of Health has designated some twenty-six of these as dangerous trades, into which minors must not be permitted to enter. The list includes many trades which the educational authorities in several states are incorporating to-day into their programmes for vocational training, as well as for industrial and trade school work. Educational authorities have a great responsibility added to their strictly pedagogic functions by reason of this fact. A knowledge of these dangers should form a part of the preparation of those who are to undertake the teaching of trades in the Public Schools. Preventive medicine has pointed out ways and means which, if employed, will reduce to a minimum many of the dangers arising from these trades. It has designated certain family and individual traits which predispose to the development of definite diseases if the person is subjected to employment at specified trades or vocations. "The disregard of this "tendency to diseases" explains the occurrence of many physical breakdowns in industrial life.



THE CANADIAN PUBLIC HEALTH ASSOCIATION

Fourth Annual Congress to be Held in Toronto

FRIDAY AND SATURDAY, SEPTEMBER THIRD AND
FOURTH, 1915

Since the last annual meeting of the Canadian Public Health Association, many of our most enthusiastic members have gone overseas, in answer to the call of our country and Empire.

The breaking out of war last August, necessitated so many of our most active members being engaged in the preparation of the first contingent for active service, that the executive committee, after very full deliberation, decided most reluctantly to cancel last year's meeting.

An effort was made early this year, to have a meeting held in Vancouver in May, in conjunction with that of the Canadian Medical Association; but that Association having decided to postpone same, the possibility of successfully carrying out this plan was removed.

It has been thought advisable to hold the Annual Congress this year, making the sessions all general. The programme will be concerned with great problems of Preventive Medicine. Discussed under the shadow of the great world war these problems take on added interest.

F R I D A Y M O R N I N G

CHAIRMAN:

Mr. F. E. Dallyn

- 9.00- 9.30—Registration.
- 9.30-10.00—General Opening Business Meeting.
1. "On the Work of the International Waterways Commission."
By PROF. G. PHELPS.
2. "Modern Methods of Sewage Disposal."
By GEORGE W. FULLER, Consulting Sanitary Engineer.
3. "Control of Municipal and Industrial Wastes."
By I. S. OSBORNE.
4. Discussion.

F R I D A Y A F T E R N O O N

(At Toronto General Hospital)

CHAIRMAN:

Dr. P. H. Bryce

1. "Diagnosis and Care of the Feeble-Minded"
(Clinic).
By DR. C. K. CLARK,
DR. W. C. HERRIMAN,
DR. O. C. J. WITHROW,
DR. C. M. HINCKS.
2. "Education of the Feeble-Minded."
By DR. HELEN MACMURCHY,
DR. E. H. YOUNG, Kingston.
3. "Immigration of the Feeble-Minded."
By Dr. J. D. PAGE, Quebec.
4. Discussion.

F R I D A Y E V E N I N G

CHAIRMAN:

Dr. C. J. O. Hastings

1. President's Address—
DR. M. M. SEYMOUR.
2. Illustrated Address on "Practical Methods of Obtaining Pure Milk."
By DR. CHAS. E. NORTH, Consulting Sanitary Expert.
3. "Modern Military Sanitation."
By DR. J. W. S. McCULLOUGH.

SATURDAY MORNING

CHAIRMAN:

Mr. Thomas Adams

1. 9.00—Visit to Housing Scheme of Toronto Housing Company.
(Party will leave hotel by street car for Bain Avenue at 9.00 a.m. prompt.)
2. 10.40—"Housing Conditions in Canadian Cities."
By DR. P. H. BRYCE, Chief M. O. for Immigration, Dept. of Interior.
3. 11.10—"A Housing Experiment at Toronto."
By MR. G. FRANK BEER, Chairman of the Toronto Housing Company.
4. 11.30—"Effects of Town Planning in Improving Housing Conditions." (Illustrated by slides.)
By MR. THOS. ADAMS, Town Planning Advisor, Commission of Conservation.
5. Discussion.

SATURDAY AFTERNOON

CHAIRMAN:

Dr. W. H. B. Aikins

- 2 p.m.—Report of Nominating Committee.
1. "Control of Venereal Diseases in Municipalities and Military Camps."
By PROF. W. A. EVANS.
Discussion opened by LT.-COL. F. W. MARLOW, F.R.C.S., A.D.M.S., 2nd Military Division.
2. "Notification of Venereal Diseases."
By DR. J. A. HUTCHINSON.
3. "Health and Charity."
By PROF. S. M. GUNN.
4. "Early Diagnosis and Control of Tuberculosis."
By DR. J. H. ELLIOTT.
5. "Notification of Tuberculosis."
By MISS EUNICE DYKE.
6. Discussion.

SATURDAY EVENING

Entertainment by the Canadian National Exhibition Association.



XVIII



ROBERT W. SERVICE

"The reason of the popularity of this poetry may be summed up almost in a word—it pictures human life. For, after all, nature worship or classic lore, ethics or abstruse philosophy, grow stale and flat when used continually as the basis of literary emotions, but every human being, who has not become a conventionalized fossil, always will be moved by the passions and moods of the surging, restless, primitive, even animal spirit of humanity that permeates Service's poems. . . . These poems must not be regarded as typically Canadian—they crystallize a phase of Canadian life, but it is a phase which has become Canadian by accident of circumstances. . . . The rhythm of the poems has an irresistible sweep; no training in the technique of versification is necessary to catch the movement—it carries one away; and the plain, forcible language grips the attention and holds it, while short, vivid, insistent epithets hammer themselves deeply into one's mind."

—Donald G. French, in the *Globe Magazine*, Dec., 1908.

ROBERT W. SERVICE is not a Canadian poet in the truest sense of the term. He was not born in Canada, nor did he arrive in this land in early childhood and grow up in a Canadian environment. He was born in Lancashire, England, in 1876, and when six years of

age moved to Scotland with his parents. He was educated in the city of Glasgow, his higher education being received in the Hillhead High School, and in the University of Glasgow.

At the age of twenty, Service came to Canada and made his way westward from

city to city, until he arrived at Victoria, B.C. The next five years he wandered back and forth on the Pacific coast, travelling as far south as Mexico, residing temporarily in every city of importance, and learning by hard, personal experience, some of the deepest lessons of life.

Finally he became a clerk in the Canadian Bank of Commerce at Victoria, and subsequently was stationed at other branches in Vancouver, Kamloops, and White Horse in the Yukon District.

It was in White Horse that most of the poems published in "Songs of a Sourdough" were written. This volume appeared in 1907 (William Briggs) and in a few weeks the author was famous. The northern wilds of Canada, particularly of Ontario, were full of prospectors, excited by the rich silver discoveries at Cobalt, and for them and for their relatives and friends, these poems had a very vital appeal. For Canadian poetry the sales were unprecedented, expanding in number in a few months into the tens of thousands.

The same author and the same publishing house have given us since, "Ballads of a Cheechako" (1909), "The Trail of '98," a novel (1910), "Rhymes of a Rolling Stone" (1912), and "The Pretender," a novel (1914).

The Montreal Witness dubbed Service "The Kipling of the Arctic World," and it was soon discovered that Kipling was his favorite author. "Kipling comes first

with me," he said. "He is the greatest of modern writers to my mind. In the poem, 'The Law of the Yukon,' they say I've had in mind his 'Red Gods.' I only wish I could write in his class. Of course, there is the Kipling idea, the Kipling method in this poem, and it's a jolly good method." But as Donald G. French well says, "Service is no mere imitator; his themes are his own, and poetic form in any case is governed largely by the subject matter. Even Kipling did not invent the ballad forms—he used what he found."

Service has also made the following interesting references to his poems:

I don't believe in pretty language and verbal felicities, but in getting as close down as I can to the primal facts of life,—getting down to the bedrock of things. . . . My idea of verse writing is to write something the everyday workingman can read and approve, the man who, as a rule, flings shy of verse or rhyme. I prefer to write something that comes within the scope of his own experience and grips him with a sense of reality.

In recent years, Service has dwelt in Europe—most of the time in Paris. He took part in the second war of the Balkans, and shortly after married a French girl, whom he met in a romantic way. He is now driving a French transport wagon.

This popular Canadian author is making a fortune out of his writings, the William Briggs Publishing House having now on deposit to his credit no less a sum than \$40,000.



THE CALL OF THE WILD

Have you gazed on naked grandeur where
there's nothing else to gaze on,
Set pieces and drop-curtain scenes
galore,
Big mountains heaved to heaven, which
the blinding sunsets blazon,
Black canyons where the rapids rip and
roar?
Have you swept the visioned valley with
the green stream streaking through
it,
Searched the Vastness for a something
you have lost?
Have you strung your soul to silence?
Then for God's sake go and do it;
Hear the challenge, learn the lesson, pay
the cost.

Have you wandered in the wilderness, the
sage-brush desolation,
The bunch-grass levels where the cattle
graze?
Have you whistled bits of rag-time at the
end of all creation,
And learned to know the desert's little
ways?
Have you camped upon the foothills, have
you galloped o'er the ranges,
Have you roamed the arid sun-lands
through and through?
Have you chummed up with the mesa? Do
you know its moods and changes?
Then listen to the wild—it's calling you.

Have you known the Great White Silence,
not a snow-gemmed twig aquiver?

(Eternal truths that shame our sooth-ing lies.)
 Have you broken trail on snowshoes?
 mashed your huskies up the river,
 Dared the unknown, led the way, and
 clutched the prize?
 Have you marked the map's void spaces,
 mingled with the mongrel races,
 Felt the savage strength of brute in
 every thew?
 And though grim as hell the worst is, can
 you round it off with curses?
 Then hearken to the wild—it's wanting
 you.

Have you suffered, starved and triumphed,
 grovelled down, yet grasped at
 glory,
 Grown bigger in the bigness of the
 whole?
 "Done things" just for the doing, letting
 babbler tell the story,
 Seeing through the nice veneer the naked
 soul?
 Have you seen God in His splendors, heard
 the text that nature renders?
 (You'll never hear it in the family pew.)
 The simple things, the true things, the si-
 lent men who do things—
 Then listen to the wild—it's calling you.

They have cradled you in custom, they
 have primed you with their preach-
 ing,
 They have soaked you in convention
 through and through;
 They have put you in a showease; you're
 a credit to their teaching—
 But can't you hear the wild?—it's call-
 ing you.
 Let us probe the silent places, let us seek
 what luck betide us;
 Let us journey to a lonely land I know.
 There's a whisper on the night-wind,
 there's a star agleam to guide us.
 And the wild is calling, calling . . . let
 us go.



THE LAW OF THE YUKON

This is the law of the Yukon, and ever
 she makes it plain:
 "Send not your foolish and feeble; send
 me your strong and your sane.
 Strong for the red rage of battle; sane, for
 I harry them sore;

Send me men girt for the combat, men
 who are grit to the core;
 Swift as the panther in triumph, fierce as
 the bear in defeat,
 Sired of a bulldog parent, steeled in the
 furnace heat.
 Send me the best of your breeding, lend
 me your chosen ones;
 Them will I take to my bosom, them will
 I call my sons;
 Them will I gild with my treasure, them
 will I glut with my meat;
 But the others—the misfits, the failures—
 I trample under my feet.
 Dissolute, damned and despairful, crip-
 pled and palsied and slain,
 Ye would send me the spawn of your gut-
 ters—Go! take back your spawn
 again.

"Wild and wide are my borders, stern as
 death is my sway;
 From my ruthless throne I have ruled
 alone for a million years and a day;
 Hugging my mighty treasure, waiting for
 man to come:
 Till he swept like a turbid torrent, and af-
 ter him swept—the scum.
 The pallid pimp of the dead-line, the en-
 ervate of the pen,
 One by one I weeded them out, for all that
 I sought was—Men.
 One by one I dismayed them, frightening
 them sore with my glooms;
 One by one I betrayed them unto my man-
 ifold dooms.
 Drowned them like rats in my rivers,
 starved them like curs on my plains,
 Rotted the flesh that was left them, poi-
 soned the blood in their veins;
 Burst with my winter upon them, searing
 forever their sight,
 Lashed them with fungus-white faces,
 whimpering wild in the night;
 Staggering blind through the storm-whirl,
 stumbling mad through the snow,
 Frozen stiff in the ice pack, brittle and
 bent like a bow;
 Featureless, formless, forsaken, scented by
 wolves in their flight,
 Left for the wind to make music through
 ribs that are glittering white;
 Gnawing the black crust of failure, search-
 ing the pit of despair,
 Crooking the toe in the trigger, trying to
 patter a prayer;

Going outside with an escort, raving with
 lips all afoam;
Writing a cheque for a million, drivelling
 feebly of home;
Lost like a louse in the burning . . . or
 else in the tented town
Seeking a drunkard's solace, sinking and
 sinking down;
Steeped in the slime at the bottom, dead
 to a decent world,
Lost 'mid the human flotsam, far on the
 frontier hurled;
In the camp at the bend of the river, with
 its dozen saloons aglare,
Its gambling dens riot, its gramophones
 all ablare;
Crimped with the crimes of a city, sin-
 ridden and bridled with lies.
In the hush of my mountained westness, in
 the flush of my midnight skies.
Plague-spots, yet tools of my purpose, so
 nathless I suffer them thrive,
Crushing my Weak in their clutches, that
 only my Strong may survive.

"But the others, the men of my mettle, the
 men who would 'stablish my fame,
Unto its ultimate issue, winning me honor,
 not shame;
Searching my uttermost valleys, fighting
 each step as they go,
Shooting the wrath of my rapids, sealing
 my ramparts of snow;
Ripping the guts of my mountains, loot-
 ing the beds of my creeks.
Them will I take to my bosom, and speak
 as a mother speaks.
I am the land that listens, I am the land
 that broods;
Steeped in eternal beauty, crystalline wa-
 ters and woods.
Long have I waited lonely, shunned as a
 thing accurst.
Monstrous nobody, pathetic, the last of the
 lands and the first;
Visioning camp-fires at twilight, sad with
 a longing forlorn,
Feeling my womb o'er-pregnant with the
 seed of cities unborn.
Wild and wide are my borders, stern as
 death is my sway,
And I wait for the men who will win me
 —and I will not be won in a day;
And I will not be won by weaklings, sub-
 tile, suave and mild
But by men with the hearts of vikings and
 the simple faith of a child;

Desperate, strong and resistless, unthrot-
 tled by fear or defeat,
Them will I gild with my treasure, them
 will I glut with my meat.

"Lofty I stand from each sister land, pa-
 tient and wearily wise,
With the weight of a world of sadness in
 my quiet, passionless eyes;
Dreaming alone of a people, dreaming
 alone of a day,
When men shall not rape my riches, and
 curse me and go away;
Making a bawd of my bounty, fouling the
 hand that gave—
Till I rise in my wrath and I sweep on
 their path and I stamp them into a
grave.
Dreaming of men who will bless me, of
 women esteeming me good,
Of children born in my borders, of radiant
 motherhood,
Of cities leaping to stature, of fame like a
 flag unfurled.
As I pour the tide of my riches in the
 eager lap of the world."

This is the Law of the Yukon, that only
 the Strong shall thrive;
That surely the Weak shall perish, and
 only the Fit survive:
Dissolute, damned and despairful, crippled
 and palsied and slain,
This is the Will of the Yukon.—Lo! how
 she makes it plain!



THE CREMATION OF SAM McGEE

*There are strange things done in the mid-
night sun*

*By the men who moil for gold;
The Arctic trails have their secret tales
 That would make your blood run cold;
The Northern Lights have seen queer
 sights,*

*But the queerest they ever did see
Was that night on the marge of Lake Le-
 large*

I cremated Sam McGee.

Now Sam McGee was from Tennessee,
 where the cotton blooms and blows.
Why he left his home in the South to roam
 round the Pole God only knows.
He was always cold, but the land of gold
 seemed to hold him like a spell;

Though he'd often say in his homely way
that "he'd sooner live in hell."

On a Christmas Day we were mushing our
way over the Dawson trail.
Talk of your cold! through the parka's
fold it stabbed like a driven nail.
If our eyes we'd close, then the lashes
froze, till sometimes we couldn't see;
It wasn't much fun, but the only one to
whimper was Sam McGee.

And that very night as we lay packed tight
in our robes beneath the snow,
And the dogs were fed, and the stars o'er-
head were dancing heel and toe,
He turned to me, and, "Cap," says he,
"I'll cash in this trip, I guess:
And if I do, I'm asking that you won't re-
fuse my last request."

Well, he seemed so low that I couldn't say
no; then he says with a sort of moan:
"It's the cursed cold, and it's got right
hold till I'm chilled clean through
to the bone.
Yet 'taint being dead, it's my awful dread
of the icy grave that pains;
So I want you to swear that, foul or fair,
you'll cremate my last remains."

A pal's last need is a thing to heed, so I
swore I would not fail;
And we started on at the streak of dawn,
but God! he looked ghastly pale.
He crouched on the sleigh, and he raved
all day of his home in Tennessee:
And before nightfall a corpse was all that
was left of Sam McGee.

There wasn't a breath in that land of
death, and I hurried, horror driven.
With a corpse half-hid that I couldn't get
rid, because of a promise given:
It was lashed to the sleigh, and it seemed to
say: "You may tax your brawn and
brains,
But you promised true, and it's up to you
to cremate those last remains."

Now a promise made is a debt unpaid, and
the trail has its own stern code.
In the days to come, though my lips were
dumb, in my heart how I cursed
that load.
In the long, long night, by the lone fire-
light, while the huskies, round in a
ring,

Howled out their woes to the homeless
snows—O God! how I loathed the
thing.

And every day that quiet clay seemed to
heavy and heavier grow;
And on I went, though the dogs were spent
and the grub was getting low;
The trail was bad, and I felt half mad, but
I swore I would not give in;
And I'd often sing to the hateful thing,
and it hearkened with a grin.

Till I came to the marge of Lake Lebarge,
and a derelict there lay;
It was jammed in the ice, but I saw in a
tree it was called the "Alice May."
And I looked at it, and I thought a bit,
and I looked at my frozen chum:
Then, "Here," said I, with a sudden ery,
"is my ere-ma-tor-eum."

Some planks I tore from the cabin floor,
and I lit the boiler fire;
Some coal I found that was lying around,
and I heaped the fuel higher;
The flames just soared, and the furnace
roared—such a blaze you seldom see;
And I burrowed a hole in the glowing coal,
and I stuffed in Sam McGee.

Then I made a hike, for I didn't like to
hear him sizzle so;
And the heavens scowled, and the huskies
howled, and the wind began to blow.
It was icy cold, but the hot sweat rolled
down my cheeks, and I don't know
why;
And the greasy smoke in an inky cloak
went streaking down the sky.

I do not know how long in the snow I
wrestled with grisly fear;
But the stars came out and they danced
about ere again I ventured near;
I was sick with dread, but I bravely said:
"I'll just take a peep inside.
I guess he's cooked, and it's time I look-
ed." . . . then the door I opened
wide.

And there sat Sam, looking cool and calm,
in the heart of the furnace roar;
And he wore a smile you could see a mile,
and he said: "Please close that
door.
It's fine in here, but I greatly fear you'll
let in the cold and storm—

Since I left Plumtree, down in Tennessee,
it's the first time I've been warm,"
There are strange things done in the midnight sun

*By the men who moil for gold;
The Arctic trails have their secret tales
That would make your blood run cold;
The Northern Lights have seen queer sights,
But the queerest they ever did see
Was that night on the marge of Lake Le-
barge*

I cremated Sam McGee.



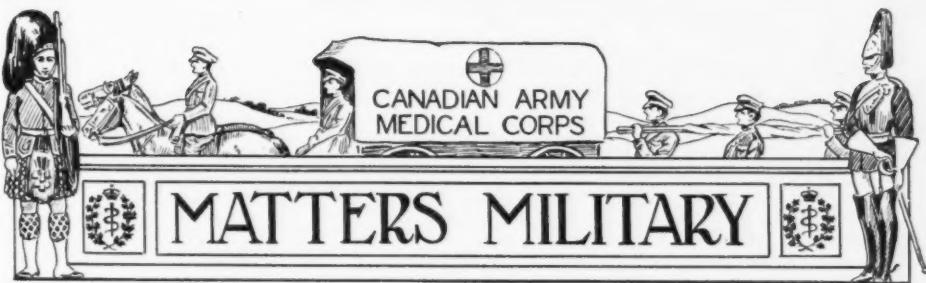
EXTRACTS FROM THE "BALLAD OF THE NORTHERN LIGHTS"

Oh, it was wild and weird and wan, and ever in camp o' nights
We would watch and watch the silver dance of the mystic Northern Lights.
And soft they danced from the Polar sky and swept in primrose haze;
And swift they pranced with their silver feet, and pierc'd with a blinding blaze.
They danced a cotillion in the sky; they were rose and silver shod;
It was not good for the eyes of man— 'twas a sight for the eyes of God.
It made us mad and strange and sad, and the gold whereof we dreamed
Was all forgot, and our only thought was of the lights that gleamed.
Oh, the tundra sponge it was golden brown, and some was a bright blood-red;
And the reindeer moss gleamed here and there like the tombstones of the dead.
And in and out and around about the little trail ran clear,
And we hated it with a deadly hate and we feared with a deadly fear.
And the skies of night were alive with light, with a throbbing, thrilling flame;
Amber and rose and violet, opal and gold it came.
It swept the sky like a giant scythe, it quivered back to a wedge;
Argently bright, it cleft the night with a wavy golden edge.
Pennants of silver waved and streamed, lazy banners unfurled:
Sudden splendors of sabres gleamed, lightning javelins were hurled.

There in our awe we crouched and saw with our wild, uplifted eyes
Charge and retire the hosts of fire in the battlefield of the skies.

And the Northern Lights in the crystal nights came forth with a mystic gleam.
They danced and they danced the devil-dance over the naked snow;
And soft they rolled like a tide upshoaled with a ceaseless ebb and flow.
They rippled green with a wondrous sheen, they fluttered out like a fan;
They spread with a blaze of rose-pink rays never yet seen of man.
They writhed like a brood of angry snakes, hissing and sulphur pale;
Then swift they changed to a dragon vast, lashing a cloven tail.
It seemed to us, as we gazed aloft with an everlasting stare,
The sky was a pit of bale and dread, and a monster revelled there.

Day after day was sinister, and I fought fierce-eyed despair,
And I clung to life, and I struggled on, I knew not why nor where.
I packed my grub in short relays, and I cowered down in my tent,
And the world around was purged of sound like a frozen continent.
Day after day was dark as death, but ever and ever at nights
With a brilliancy that grew and grew, blazed up the Northern Lights.
They rolled around with a soundless sound like softly bruised silk;
They poured into the bowl of the sky with the gentle flow of milk.
In eager, pulsing violet their wheeling chariots came,
Or they poised above the Polar rim like a coronal of flame.
From depths of darkness fathomless their lancing rays were hurled,
Like the all-combining searchlights of the navies of the world.
There on the roof-pole of the world as one bewitched I gazed,
And howled and grovelled like a beast as the awful splendors blazed.
My eyes were seared yet thrall'd I peered through the parka hood nigh blind;
But I staggered on to the lights that shone, and never I looked behind.



THE MILITARY FUNCTIONS OF AN ARMY MEDICAL SERVICE

By LIEUT-COL. M. W. RUSSELL, R.A.M.C.

AS Staff Officer it is of great moment that you should have a just appreciation of the relations of the various services in the Army to the Army as a whole, as well as of the relations of these services to each other. My object is to explain to you these relations in so far as they affect the medical service. My remarks are of an introductory nature, and will deal solely with the military aspect of the question.

If the man in the street were asked to say what were the functions of the medical service of an army, he would probably reply: "To take care of the sick and wounded." The role is an honorable and much prized one, and one which the medical officer is the least likely to belittle. He regards it, perhaps, as one softening trait in a grim business, one attempt to extenuate and mitigate the violence which is the very essence of war. But he knows quite well that the reply is a very partial and incomplete one, and while glad and proud of his humanitarian functions, he is fully aware that they are no justification for the existence of his service as a military body, and that had he no other essential part to play he might, with a good conscience, assent to his own abolition and to the handing over of his duties to the Red Cross or some similar organization.

War is a stern business, involving, perhaps, the very existence of a nation. The issues are so tremendous that nothing in a military organization which places these issues in doubt or jeopardy can be justified. A general entrusted with an army must at all costs prevail against his enemy; he must be prepared to sacrifice everything for the attainment of his object; the lives of his troops, the suffering of his men are the price he must pay for the success which is demanded of him. If he allowed any humanitarian considerations to stand between him and his mission he would be held to have failed in the trust committed to him. Everything therefore must be subordinated to the one end; every element in his army must help toward that end. If it does not so help, it must be cast away.

If the medical service can render active military assistance in deciding the course of a battle or campaign, it has so far justified its existence. Without such value it has no real *raison d'être* in military organization.

That is possesses this military value, and that this value is recognized to be of increasing importance, is demonstrated by the growing attention which is being paid to it in all armies. What then are the influences of an army medical service on the efficiency of an army regarded as a fighting engine?

They are of two kinds: (1) Indirect, and (2) direct. Of the indirect two stand out prominently: (1) The political influence on the nation at large; and (2) The moral influence on the fighting troops.

The work of a general commanding in the field is in direct subordinate relation to policy—the Government dictates the object and scope of his work, and criticizes his performance. The Government in its turn is answerable to public opinion. In war time the public is always anxious, generally excited, and ready to vent its feelings if things go wrong. Though in ordinary times the people do not show any marked interest in the army, when war occurs things are different, and the country becomes keenly concerned for its soldiers. It realizes that it has sent them out to lose life and limb in its service, to suffer great hardships and privations, and it is determined that these hardships shall be minimized, so far as the expenditure of money and efficient organization will permit. Money is lavishly given at the time, and the organization concerned is narrowly scrutinized. If shortcomings are detected the public grows restive, murmurs are heard, which quickly grow into a clamor. Pressure is brought to bear on the Government and is by them passed on to the general when the latter in the midst of delicate military operations which should have his whole attention, is beset with inquiries, overwhelmed with correspondence, and possibly required to appear before a Commission to give an account of matters of which he can have only an indirect knowledge. His energies are diverted from their proper sphere to allay a storm of popular indignation, which should never have been given occasion to arise.

Our military history teems with examples of this sort, all traceable to the initial non-efficient organization of the medical service for the task it was set to do.

One may cite the outcry in England after Talavera, which caused so much annoyance to Wellington in the Peninsula; the public and Parliamentary recriminations over the unfortunate Walcheren expedition; and the popular excitement over the breakdown in the Crimea. Biographical works dealing with that period, such as "The Panmure Papers," "The Life of the Duke of Newcastle," "The Life of Lord Herbert of Lea," give numerous instances of ministers writing peremptory letters of complaint on the medical situation to general officers commanding, the latter already harassed almost beyond endurance by the military difficulties with which they had to deal. Reports without end were called for, and a Commission was sent out to investigate on the spot the condition of affairs. As a result of their inquiries the medical imbroglio was put straight; but meanwhile, military matters had sadly suffered from the interruption, and the public confidence had been disturbed.

In 1882 in the Egyptian war we had a similar experience, but this time the war being a short one the Commission was mercifully reserved until its close.

The repetition of the same sequence of events in the South African war is too recent to need more than mention.

We cannot deprecate such interferences of the public when cause is shown. The proper care of the sick and wounded is a raw spot on the public conscience; it is easily irritated and inflamed, and then with difficulty soothed. The lesson is plain. If generals are to enjoy the immunity from disturbance which the exacting nature of their task demands, one particular which cannot be overlooked is the efficiency of their medical service. Do not misunderstand me. Generals are just as solicitous for the welfare of their sick and wounded as the public, possibly more so, but they have to do the best with the means provided. It may, however, perhaps not be too much to say that, unless they have an accurate appreciation of the complexity and the severity of the task which the medical service has to perform in war, they may fail to demand, and to insist on having, means adequate to the performance. In this way alone the study of military medical organization will repay an officer when he comes to assume the higher responsibilities. Knowledge and foresight may spare him one of the most trying experiences it can fall to the lot of a commanding general to undergo. There is another way in which such study may be of great profit. The medical service must subserve

the military purpose. Who is so capable of making suggestions advantageous to both as he who has studied the two?

May we take it that the political influence of the medical service is granted; that such influence, if the service is efficient, is helpful to the general, and through him to the troops?

That an efficient medical service has a powerful influence on the *morale* of an army cannot be gainsaid. The higher we ascend in the scale of civilization the greater the value the fighting man places on his life, the more exacting he becomes that he is spared all unnecessary risks, and that adequate measures are taken to care for him, and to give him the best means of recovery should he be stricken. Men will now perform just as great deeds for an idea as in the past. In an emergency there is nothing they will not do if properly inspired and led; but the soldier is proud of himself and his calling, and sets a store on himself. There are certain things which he considers his due, and one of these is proper medical attendance. He will not give of his best unless he feels that he is being well done by. Moreover, the absence of proper medical arrangements has a most depressing effect on an army, while its presence is equally stimulating.

The horrors of a soldier's life without proper medical care are difficult to conceive. Let us see what they were.

Ambrose Pare was one of the greatest military surgeons France has ever produced. He may be rightfully called the father of military surgery. Born in 1510, he lived until 1590. His first military service was in 1536 in the campaign of Turin. In a description of the conditions after a battle, he mentions that he went into a stable where some wounded men were sheltered. He writes: "As I was looking at them in pity there came an old soldier, who asked me if there was any way to cure them. I said, no. And then he went up to them and cut their throats, gently and without malice. And when I upbraided him he answered and prayed God, when he should be in such a plight, someone would do the same for him, that he should not linger in misery."

I leave you to imagine the influence of such a condition of affairs in the present day on recruiting and desertion returns. Further, would it encourage men to take undue risks of being wounded? Pare was unusually acute and assiduous in the study of his profession, and quickly rose to a very prominent position, being made surgeon to the King. In 1552 the city of Metz was being besieged by the Emperor, and was reduced to great straits. The fortitude of the garrison was giving way. In his extremity the Duke of Guise, commanding the defense, begged of the King (Henry II.) to send them Pare. The King sent for Pare, gave him money and stores, and bribed an Italian captain to assist him in passing into the beleaguered city. After many dangers Pare succeeded in entering Metz. He had by this time been connected with the army for some sixteen years, and was well known to the soldiers, prince and peasant alike.

On the day after his arrival the Duke of Guise presented him dramatically on the ramparts. He was hailed by all with enthusiasm, the soldiers delightedly shouting, "We shall not die even though wounded, for Pare is among us."

His presence gave new vigor to the defense by putting fresh heart into the men and thereby contributed materially to the saving of the city.

The psychology of the soldier in war is a fascinating study. Writers, such as Colonel Henderson, Captain Fritz Hoenig and others have shown us how many hidden springs there are which animate the man: how slight a margin there is in many a man between courage and fear; and how the soldier's resolution must be reinforced by every appeal possible to his self-respect, his patriotism, his pride in his corps and calling, and last but not least, his self-interest. He must be assured that, as great sacrifices are demanded of him, so nothing will be left undone to mitigate the sufferings he will have to encounter, and to save the life which he is asked to expose. Then, and then only, can he be called upon with confidence for that supreme self-sacrifice so often necessary for the winning of battles.

A French writer (Dr. Jean Lemieux), commenting on their Madagascar sanitary *debacle*, says: "Le soldat sait mourir pour son pays, il est habitué à l'idée d'être frappé par une balle ennemie. Par contre l'esprit de sacrifice n'est pas suffisamment développé pour lui permettre de supporter des souffrances qu'il juge inutiles. Il rapporte à ses chefs la cause de ses misères et la démorisation en est la conséquence."

Let us now turn to the more direct means by which an efficient medical service helps an army in the field.

First and foremost may be placed the prevention of loss by disablement.

The wastage of an army in the field amounts to about 80 per cent. of its strength in the course of a twelvemonth; some place it as high as 90 per cent. such a loss is appalling to contemplate.

Deaths from wounds form a proportion of what may be regarded as unavoidable loss, dependent, of course, on the severity of the actual fighting, but always accounting for only a small fraction of the total. Disablement from wounds is responsible for a large number. The above two categories taken together do not make up half the total, and have rarely amounted to one-quarter.

Of the men disabled by wounds, a large proportion are only temporarily lost, given a properly organized and equipped medical service. Thus, of the wounded sent back in South Africa of Lord Methuen's division in the advance from the Orange River, up to and including Magersfontein, 60 per cent. had returned to the ranks in a month. Oberstabsarzt F. Schaefer, a German observer with the Russian army in Manchuria, in an article in the *Deutsche Militärarztliche Zeitschrift*, states: "We found about four months after the battle of Mukden that of about 30,000 wounded of three army corps, almost one-half (45 per cent.) were again in service at the front. In certain smaller organizations the percentage of those able to resume duty was still higher, reaching 56 per cent. in a rifle division, and 66 per cent. in a Cossack division. In some infantry regiments over 500 men who had been wounded and had recovered, stepped out for our examination."

It must be remembered that this was in the later stages of the war, when the Russians had learned in the hard school of experience and had brought their hospitals up to a high pitch of efficiency. The army reaped its reward in the enormous numbers who were able to rejoin the battle line.

We had a similar experience in the later stages of the Peninsular War, when, under the admirable administration of the medical service by Sir James McGrigor, Wellington's Principal Medical Officer, men who would earlier have been irretrievably lost streamed back from the hospitals to the colors in numbers which astonished and delighted the General, enabling him to give battle when, without this increase to his force, he might have shrunk from doing so.

It is not necessary to emphasize the military value of the medical service in this respect: it stands self-evident.

But the main wastage of an army is not from killed and wounded. Disease is by far the most malignant factor. Armies in which the loss by bullets has been negligible have been destroyed by it.

For examples in our own history Walcheren and the first Ashanti expedition (1864) may be cited. The West Indies furnish other examples. In the French expedition to Madagascar in 1896, of 12,000 Europeans sent to Majunga, in four months 3,000 died, 6,000 had to be invalidated, while the remainder were so weakened as to be barely able to carry their rifles. The army was absolutely broken as a fighting force, and only the entire lack of military resistance saved it from destruction.

These are extreme examples, but they are only worse in degree than the losses suffered from disease in other campaigns. Think of the 21,000 cases of enteric fever in the American Volunteer camps during the Cuban War. Think of our losses in the first half of the Crimean War, which paralyzed military effort; and of the equally deplorable rate of sickness among the French in

the later period, which is by many thought to have been the main cause of their bringing the campaign to its abortive close.

An efficient medical service can change all this, can prevent the great bulk of these losses, can save these men from rotting of fever and dysentery and keep them strong and vigorous, fit instruments for the execution of the general's designs. This is direct military help. How is this end to be attained?

If an amateur commander, ignorant of the precautions enjoined by military science, took a force into an enemy's country and had that force destroyed, you would say that he had met with his deserts, that he should have been properly instructed before embarking on such an enterprise. Ignorance would not be held a valid excuse.

Have we not been doing much the same in a different but, perhaps, more deadly field?

All these enormous losses from disease are in great part due to avoidable violations of known hygienic laws. The laws are simple; it is their application which is difficult. The difficulty is not insuperable, nor is its solution incompatible with military exigencies. But the solution entails knowledge and some trouble. The first essential is instruction. The laws must be widely inculcated, knowledge must leaven the mass. Then we shall have understanding, co-operation will follow, and under expert guidance the common effort will produce results such as a few years ago we had hardly dreamed of.

It is not open to doubt. You have only to look at the figures of the last few years since the higher instruction of the experts at our College has proceeded hand in hand with the instruction of the soldier and his officer.

Let me quote from the speech of a responsible Minister in the discussion of the Army estimates in the House of Commons three years ago: "As to the question of disease, within a decade the effective strength of the Army, as indicated by the fall in the constantly sick rates, had been raised by 5,700 men, and the wasting through deaths and invaliding had been reduced by 2,900 men per annum, or at the rate of a division of troops for each decennial period. Within four years these changes had led to a reduction of hospital beds at home stations by over 2,200; with a similar reduction, perhaps greater, in hospital accommodation required in India. In the United Kingdom the average of deaths during the ten years 1889-98 was 4.32. In 1908 the average per 1,000 was 2.50, a reduction of very nearly one-half on the average of the whole ten years. The average number of men continually in hospitals during these ten years was 41.14 per 1,000. In 1908 it had fallen to 23.94. In India during the same period the death rate per 1,000 was 16.43. Last year it was 9.27. The average of the constantly sick for the ten years was 89.61, while last year it was 45.81. These are very remarkable figures."

They are very remarkable, but they have been bettered since.

In the report on the health of the Army in the United Kingdom for 1909 the ratios per 1,000 of strength for that year are:

Admissions, 378.4, a decrease of 50 on the preceding year.

Deaths, 2.92, an increase of .4 on the preceding year.

Invalids, 10.51, a decrease of 2.03 on the preceding year.

Constantly sick, 21.72, a decrease of 2.22 on the preceding year.

In India the ratios are:

Admissions, 716.9, a decrease of 119.3 on the preceding year.

Deaths, 6.37, a decrease of 2.90 on the preceding year.

Invalids sent home, 9.06, a decrease of 6.61 on the preceding year.

Constantly sick, 40.26, a decrease of 5.55 on the preceding year.

The figures for the whole Army at home and abroad show a diminution in 1909 over 1908 over all the headings of admissions, deaths, invalids and constantly sick. Improvement is, therefore, still progressive.

These are, of course, peace figures, but they cannot fail to react on those of war.

In 1887 an authoritative work on military hygiene laid down the proper provision of hospital beds for an army in the field as 25 per cent. of the strength of the force. In South Africa we had at one time 10 per cent, i. e., 30,000 for 300,000 men, and none too many under the then conditions, when you consider that all the hospital beds provided can no more be made available at once, than all the men composing a force can be brought at once and the same time into the line of battle.

Given a sanitary organization and sanitary instruction of the army at large, the medical service is now content with a bare 7 per cent. of hospital beds, and is already counting the days until it can be satisfied with 5 per cent.

Lower than this it may not be possible to go, unless the enemy can be persuaded to shoot fewer, an expectation, it is feared, not to be counted upon.

Does not this mean an enormous saving in cumbrous hospital equipment? Is not the mobility of the army thereby enhanced and its military value increased? Does it not substantially lessen the strain on the transport and supply services? It may be thought that the medical service is engaged in the uncongenial task of performing the "happy dispatch" on itself, improving itself out of existence. There is no such prospect. Facts and figures have abundantly proved that the sick rate varies inversely with the medical establishment. It is the addition to the medical establishment, given within the last few years, which has rendered possible the results which have been attained. It is the development of the preventive side of their work which has produced the effect noted.

So long as there were only enough officers to attend to the curative work in the hospitals, little could be done in the way of prevention. Once men became available to attend to prevention, hospital admissions began to dwindle, more men were set free to develop the preventive side, and the effect became cumulative. The results I have read to you.

The converse can be seen on the other side of the Channel. Two years ago I read in a French paper an article in which the position was quite clearly exposed. The French were experiencing great difficulties in recruiting medical officers. Their numbers were dwindling, and, *pari passu*, the sick rate was ascending. They had not been slow to appreciate the relation between cause and effect, nor had they failed to point it out.

The law is no new discovery, but the means for its application have only recently been given to us. Its recognition in war time will mean fewer men in the hospitals and more in the ranks, a consummation to be strenuously worked for.

The next great direct military assistance which the medical service gives is by disencumbering the fighting force of its non-effectives. To quote the official book:

"The medical service in the field is based on the system of evacuating sick and wounded. The efficiency with which this system is organized greatly affects the mobility and morale of the army."

"The medical service will deal with the discipline, pay, clothing and disposal of all sick and wounded from the time they come under medical care until they are discharged to duty."

That is to say, having by close and careful sanitary supervision ensured to the commander the maximum number of men in the fighting line, the duty then devolves on that service of freeing him from all encumbrances in the way of non-effectives, and arranging for their disposal.

The presence of large numbers of sick and wounded with a fighting force hampers its movements, throws an unfair and unremunerative strain on the supply service, and has a depressing effect on the troops at a time when it

is most important that their spirit should be maintained at its highest pitch. Prompt removal is, therefore, a matter of military urgency. It is the more urgent when troops are not flushed by success, but are, perhaps, dashed by a check or defeat.

Instances of armies being immobilized by the want of means for disposing of their casualties are not uncommon. Our own plight after the Alma is a case in point.

The necessity for a special organization for the speedy removal of the wounded from the field was first recognized by the French in their period of greatest military glory. The originators were Baron Larrey and Baron Percy, two of the most famous of military surgeons. These organizations were first started in the revolutionary armies, and were subsequently fostered and encouraged by Napoleon. Humanitarianism played but a small part in their conception; they were instituted on their military merits. It was recognized that, if quickly retrieved, wounded recovered in greater numbers and more speedily found their way back to the ranks; that the men were inspired by seeing prompt care taken of their stricken comrades; and that the presence of special bearers afforded some check on what had become a crying evil—the practice of men leaving the ranks on pretense of conveying a wounded comrade to the rear. Three very cogent military reasons.

Baron Percy, in describing the inception of his organization, says: "Tired of the ceaseless disorder caused by the assemblage of undisciplined hospital attendants; distressed at seeing the deaths on the field of so great a number of soldiers whose lives might have been preserved and limbs saved if they had had the help of a commodious and well organized mode of transport; having seen, moreover, the necessity of having as near as possible to the line of battle men specially destined to carry off the wounded, instead of leaving them to the care of soldiers, who too often seized this opportunity for leaving the ranks; I took upon myself to organize a Regular Corps of army hospital attendants (*soldats infirmiers*), to whom I gave the name of companies of brancardiers."

These stretcher-bearers were subsequently regularized by an Imperial Decree for the whole French Army.

It will be seen that the desire to do away with disorder and to limit the opportunities for shirkers was, at least, as potent a reason for their introduction as the wish to soften the hard lot of the wounded.

Speedy evacuation of the wounded has another military advantage, which is by no mean unrecognized. We have been told of the extraordinary efforts made by the Russians to clear away their wounded before abandoning any of the battle grounds in Manchuria, and of the great success with which their efforts were attended. To say that this was due to any fear of ill-treatment would be a libel on the Japanese. The latter were just as eager and successful in getting their own wounded away. The reason was obviously that the enemy should not be able to gauge the damage he had done. Few things are more baffling and discouraging to an army after a hard fought engagement than the want of knowledge or evidence of the weight of the blow struck. Is not the abandonment of wounded the surest and most clinching evidence of defeat?

An instance from the American War may serve as an illustration, if illustration be needed.

In the account of Stonewall Jackson's retirement from Kernstown, where he mauled a force of the enemy largely superior to his own, but knew he had only mauled it, and that it was still in the immediate vicinity, Colonel Henderson tells us: "During the evening of the 23rd the Medical Director of the Valley army was ordered to collect vehicles and send the wounded to the rear before the troops resumed their march. Some time after midnight

Dr. Maguire finding that there were still a large number awaiting removal, reported the circumstances to the General, adding that he did not know where to get the means of transport, and that unless some expedient were discovered the men must be abandoned. Jackson ordered him to impress carriages in the neighborhood. 'But,' said the surgeon, 'that requires time; can you stay until it has been done?' 'Make your mind easy,' was the reply. 'This army stays here until the last man is removed. Before I leave them to the enemy I will lose many men more.'"

Having initially secured to the commander the maximum number of men in the fighting line, having then removed all non-effectives, and so maintained the mobility of the force, the next pre-occupation of the medical service is to return as speedily as possible all who, having been temporarily disabled, have recovered sufficiently to resume their place in the ranks. Here, again, the efficiency of the medical service bears directly on the fighting efficiency of the force. A lax and ill-organized medical service in the early stages of the Peninsular War was the cause of Wellington's ranks being depleted, and of a large proportion of his men being wasted in his hospitals and in the pleasure haunts of Lisbon. I have already mentioned the difference that a capable administrator and an efficient service made. Examples might be multiplied.

This function of the medical service is one of increasing importance, as the great advances of surgical science and the nature of the wounds made by the present small bore bullets have greatly increased the proportion of wounded who, given early and skilful treatment, will be able quickly to return to their places in the ranks.

The hospitals, while retaining their old character of havens for the poor unfortunates broken down by the vicissitudes of war, are becoming more and more great repairing shops for the army. I have already quoted Manchurian figures to this effect, as well as the figures of Lord Methuen's Division in the advance from the Orange River.

There is one other aspect on which, perhaps, a word may be said. Besides warding off disease and so keeping the ranks full, the medical service may be of further assistance by helping to keep the men fit or make them fitter. We all know the dangers of staleness. Nothing conduces more to that state than a monotony of diet. By narrowly watching the ration scales and suggesting timely variations the medical officer can be of material help. Similarly, by keeping an eye on the clothing he can be of use, by gauging the demands which are made on the physical powers of the men he may at times be able to make valuable suggestions, and so assist in nursing the men. Of course such suggestions are for the commander to take or leave; they must always be dominated by the military necessities; but if offered with discretion and based on sound physiological knowledge (without such knowledge they would probably be useless), such suggestions will frequently be found to amply repay consideration. It is often by attention to minutiae that excellence is gained.

There is no more astounding example of great results following small causes than the birth of the Japanese Navy as a sea power, a result, strange as it may seem, due to a dietary suggestion made by a young Japanese naval medical officer. The Japanese ships had been tied to their own shores by the fact that on a long voyage the crews invariably became disabled from beri-beri. This young naval medical officer, Takaki by name, after a patient investigation, became convinced that the cause of the trouble lay in an unsuitable ration. He pressed his views on the authorities, but met with every kind of opposition and discouragement. Still he persisted, and eventually succeeded in wringing a reluctant trial. The change suggested was quite a small one, the substitution of a proportion of barley for some of the rice which formed the staple of the diet. But it was scientifically correct and the results were momentous. Beri-beri was banished from the ships, Japan became a sea power, and Takaki a Baron of the Empire.

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PLUMBING PROBLEMS

By JAMES SMITH,

Cert. Incop. San. Assoc., Scotland, Assoc. Royal San. Inst

Chief Plumbing Inspector, Winnipeg, Man.

Read before the Winnipeg members.

I HAVE had some difficulty in determining what subject on plumbing I should discuss with you without being too technical, and finally decided after pondering on the matter for a few days not to give you a paper, but rather a talk on the problems we are meeting every day in designing, inspecting and testing plumbing. In presenting such a subject it is necessary to remember that Winnipeg by reason of her geographical situation is subjected to unique conditions, and those unique climatic conditions impose on us conditions which are unknown in other parts of the continent and undreamt of in the milder and more temperate parts of the world. There are a number of plumbing problems, however, which are common to all climates, and one of them—which is, the determining of the relative sizes of soil, waste and vent pipes, so that syphonage and compression may be avoided. I would like to deal with for a short time, as at present it is engaging the attention of sanitary engineers throughout the country.

Syphonage and Compression.

Hitherto the rule of thumb method of calculating the sizes of piping has obtained, but incident with the demand for

higher buildings it was found that in buildings over eight storeys in height, and particularly when the general lavatories were placed as is commonly done on the upper floors, that the discharge from the fixtures on the top floors created syphonage and compression in the stacks, and either pulled the water out of the traps by syphonic action or blow the water out by compression, and tests carried out in the past four or five years clearly demonstrate that the problems of the soil waste and vent stack are still unsolved and are becoming more complicated with the increase in the height of buildings.

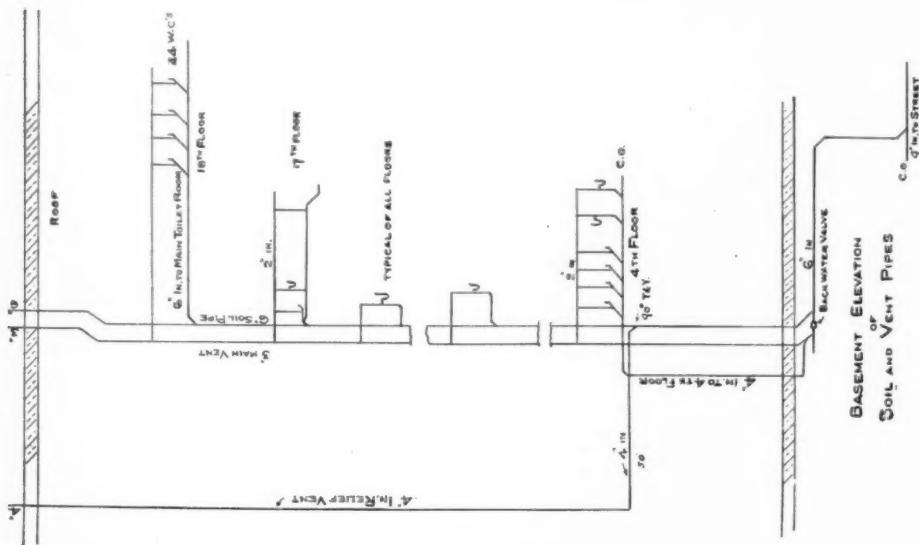
In Chicago a very interesting experiment was carried out about two years ago by Mr. T. J. Claffy, assistant Chief Sanitary Inspector. In an office building the main toilet rooms were on the 18th floor, as shown on this sketch, and on this floor over 40 water closets and six basins were connected to the 6-in. stack, and each fixture was separately vented, the vents being connected on each floor to the 3-in. main vent stack. On the 17th floor there was a water closet, lavatory, bathtub and shower bath, and below this on each floor to the 4th floor a lavatory was connected. On the 4th floor four

water closets, two lavatories and a slop sink were connected all **separately vented** as shown on sketch.

It was found that when the main toilet room on the top floor was in heaviest use, the trap seals on all floors below were either syphoned or blown out. A relief vent had been taken off the line near the ceiling and extended outside the building, terminating in a return bend close to the wall and sidewalk. Its only function seemed to be deluging with sewage the passing public, and so was promptly closed.

As demonstrating the tremendous compression in a system such as this, when the discharge from the toilet room on the top floor approached the volume of a rush hour service the spray, carried by the compressed air wet the hand when placed over the open pipe at the 6th floor.

For several years now experiments have been conducted in the Illinois University under the auspices of the American Society of Sanitary Engineering, and the deductions arrived at from these experiments are:



A plumber who had been called in to stop the nuisance had extended an independent 4-in. line from basement ceiling to 4th floor, inserting a back water valve, as shown on sketch. This stopped the trouble on the 4th floor, but only served to increase it on the floors above. Finally a 4-in. relief vent was connected to main stack between the 3rd and 4th floors and extended separately through roof. It was noticed during the erection of this pipe that as its height increased its efficiency decreased, and although it solved the problem of loss of trap seal there was considerable agitation of the water in the traps when the pipe finally extended to the roof.

"1st. We must know the maximum volume of sewage flowing, the period of duration of the flow and its velocity.

"2nd. We must determine how much air will be moved under the above conditions and the period of time required to move it.

"3rd. We must reduce the effect of the velocity and pressure head of this moving air so as not to endanger trap seals, and

"4th. Having the above information the designer must strive to reduce velocities and eliminate air."

"In most soil pipes there is so much air moved by the flushing of fixtures that the air rather than the water is the de-

termining factor in proportioning the stack," and it is along these lines that further experiments are to be carried on both in the laboratory and in field work till a practical solution of the difficulty based on scientific data is arrived at.

These troubles have usually been avoided in the past by making the pipes big enough and venting them liberally, but the result is that from the standpoint of the sewage discharged they are absurdly large.

Fortunately and perhaps more on account of good luck than good guidance, we have not had a great deal of trouble from this cause in Winnipeg. The only experience we have had was where an ejector discharge was connected to the same drain as the other fixtures, and when the ejector was discharged it blew out several fixture traps. On investigation we found the ejector working under 60 lbs. pressure (an abnormal pressure), whereas it only required 15 lbs. to work efficiently. After adjusting the ejector there was no further trouble.

Grease Trap.

Grease traps are an abomination under any circumstances, and whether they are a necessary evil is beginning to be debated in sanitary engineering circles. They are certainly a contradiction of one of the principles of sanitary plumbing, they are not self-cleansing. It is generally admitted that a grease trap to be efficient should have a capacity twice as large as the amount of water discharged through them at one time. Grease traps under some of our large hotel kitchen sinks or dish washers fulfilling that condition would be nothing more or less than cesspools.

In more temperate climates the grease trap in most cases is placed outside and built into the ground with brick or concrete, being out of sight and for the most part out of mind it may be less objectionable till it is opened up to be cleaned out, and that is only done usually under compulsion.

More recently the water cooled type of grease trap has been introduced and is now used very largely, but except that it is a very costly fitting no marked improvement has been noted, and the best

that can be said is that under certain favorable circumstances this type of grease trap may be less unsatisfactory than the old type. There is, however, to my mind, a serious objection to this type of grease trap, as it violates in my opinion one of the basic rules of sanitary engineering, and that is that no direct connection nor the possibility of such should be allowed between water supply pipes and waste pipes—or stated in clearer terms—there should be no arrangement of piping which would under any circumstances allow the water supply to be contaminated by sewage. This is exactly what might happen if a defect developed in the cast iron partition of the water cooled jacket. So long as the water was turned on nothing untoward could happen, but as soon as the water was turned off there is a possibility of sewage from the grease trap being drawn into the water pipes by siphonic action, and when the water is turned on again the sewage polluted water would be disseminated through the building, with possibly very disastrous results.

Perhaps the greatest disadvantage in the use of grease traps is that they require a good deal of attention and cleaning out if they are to work with even a minimum of efficiency. The cleaning of a grease trap is a most objectionable exercise in the practice of practical sanitation, and this no doubt is the reason why so little attention is given to them. From my own experience I would venture to say that not 25 per cent. of the grease traps in use to-day are properly attended to and regularly cleaned out. This is usually done long after the trap is filled to its capacity with grease, and when the waste pipe beyond the trap is also filled to its capacity—in other words—blocked.

I have endeavored to point out the disadvantages of the grease trap in the foregoing, and as it has only one aim and object, viz., to keep the grease out of drains and sewers, and as I have shown that this is not accomplished to any great extent by its use, it becomes a debatable question whether the use of a grease trap is justified. There is certainly not an overwhelming amount of evidence in their favor, and I believe the

next few years will see a reversion to some simpler type of fitting which will accomplish the removal of grease from waste water without creating insanitary local conditions, and the grease trap as we know it now abolished.

Enquiry made by the Research Committee of the American Society of Sanitary Engineering brought out the information that few cities demand grease traps, many allow them to be installed, and a few will not tolerate them under any circumstances.

Explosions in Sewers.

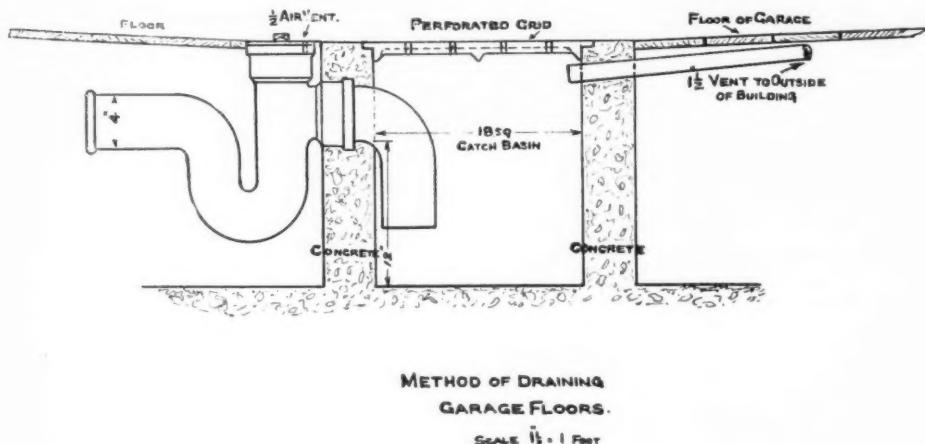
Explosions in sewers are becoming of more frequent occurrence as the use of inflammable volatile liquids, such as gasoline, extends both for motive power and

have occurred in the Winnipeg sewers, fortunately with comparatively little damage.

There are a number of devices manufactured to prevent the ingress of gasoline into sewers in the form of floor drains for garages, etc., and we have used the device illustrated in several places with success, but to make the remedy effective it would be necessary to have all floor drains in garages and other places where gasoline is used treated in similar manner, and we hope to get legislation to this end after further inquiry and investigation.

Frost Closure.

Frost closure of terminals of soil and waste pipes is probably the hardest prob-



cleansing purposes, and an effective method of preventing such liquids entering the sewer is still a matter for speculation.

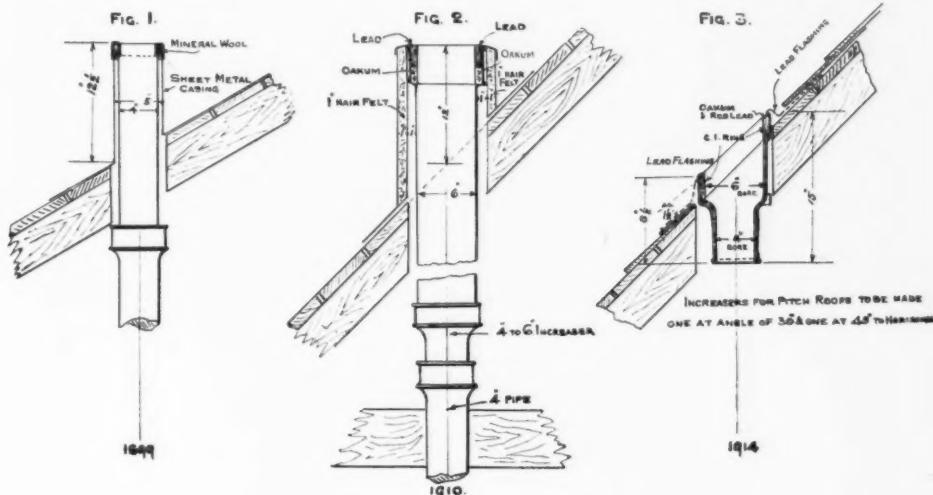
There is no doubt as to the seriousness of the result of gasoline finding its way into the sewers, as explosions have occurred in the sewers of several cities throughout the continent in the past few years, causing a very great deal of damage to property and in one instance the loss of life. It is very evident that gasoline is being discharged into sewers from garages and dry-cleaning establishments, as it is not uncommon when entering a sewer or passing a manhole to detect the odor of gasoline, and several explosions

have had to deal with in this climate, and we have spent much time and energy in the past five years on this subject.

From the ordinary 4-in. pipe cased with galvanized iron, as shown in Fig. 1, we passed to the type shown in Fig. No. 2, commonly known as the "garbage can," which came into use about four years ago. Although this was an improvement on the old method it was only partially successful, and a year ago a new type of terminal was devised, Fig. 3, which has met with more success. The present winter has not been very severe, and so a very reliable test has not been made for ice formation, but in other respects the test has been unusually severe

by reason of the large amount of snow that has fallen. To date we have not found a terminal of this description entirely closed, although we have circu-larized the trade asking to be informed at once if any such terminal was found closed with frost or snow, and in addition the department have made numerous inspections of terminals constructed in this manner throughout the winter.

the premises by means of an increaser with top end conforming as near as possible to pitch of roof and projecting to the outer air not less than one inch and not more than three inches at any point above the roof, and be made weather proof by means of a lead flashing. All such lead used for this purpose shall be in weight at least 5 lbs. per square foot, and shall be worked over and into the



THE EVOLUTION OF THE SOIL-PIPE TERMINAL
SCALE $1\frac{1}{2} = 1$ FOOT

The by-law controlling this point now reads:

"All terminals of soil, waste and ventilating pipes of 4 inches in diameter or less shall be increased 2 inches in diameter before passing through the roof of

hub of increaser with not less than five inches of cover on the roof on either side of the pipe terminal, and it shall be finished with a cast or wrought iron ring properly caulked with lead or oakum and red-lead into the hub thereof."



PUBLIC WELFARE

CANADA AND THE EMPIRE

When our Aryan forefathers broke up their homes in South-ern Asia, some of them went to India. When that Empire was added to Britain, Queen Victoria gave these, our Indian cousins, her pledge (and her son Edward and her grandson George have since reiterated that pledge), in which she said: "We hold our-selves bound to the natives of our Indian territories by the same obligations of duty which bind us to all our other subjects. May the God of all power grant to us and those in authority under us strength to carry out these."

In 1911, an ex-soldier from India who had settled in Canada went home to bring out his wife and child. On his return they were detained under bond of \$1,000 and were admitted after three months' litigation, but only as an act of grace. This ex-perience has since been repeated, the amount of the bond being doubled.

About 2,500 of these fellow-citizens from India are in Can-ada, the great majority of them being Sikhs. Only five of these men's wives have thus far been admitted. Yet they are the husbands of one wife each; they insist on temperance and physical and moral purity; they are distinguished loyalists, hav-ing saved the Empire at the time of the mutiny. They have fought in Asia and Africa and are now fighting in Europe for our "free institutions" with a bravery unsurpassed, and are showing a generosity which is the admiration of the Empire.

Is it not time for us to think what our treatment of them on the western coast looks like to them? Is it not time for our Government to "clean house" in this matter? Turkish Moham-medans, who would have several wives if they dared, enjoy all the privileges of other Europeans in this Dominion and are allowed to bring wives and children here; why should our own fel-low-citizens, who are bearing the burdens of the Empire and are superior to the Mohammedan in every way, have their wives and children excluded? They want to stay here where they now own millions of value, and they want to bring their wives. That is all they ask.

Dr. Lawson, Inspector of Immigration, says: "It was my duty to make a thorough physical examination of each im-migrant. . . . I refer in particular to the Sikhs, and I am not ex-aggerating when I say that they were 100 per cent. cleaner in their habits and freer from disease than the European steerage pas-sengers I had come in contact with. The Sikhs impressed me as a clean, manly, honest race. I have not yet seen one good rea-son why they should not be permitted to bring their families in as freely as an European immigrant. Justice, humanity and morality all cry for the removal of restrictions which prevent the Sikhs enjoyment of home life." —Albert D. Watson.

